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Control-M
User Guide

Supporting

Version 7.0.00 of Control-M/Enterprise Manager
Version 7.0.00 of Control-M/Server *for UNIX and Microsoft Windows*
Version 7.0.00 of *for UNIX and Microsoft Windows*
April 2011

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  - system hardware configuration
  - serial numbers
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About this book

This book contains procedures that you perform with the Control-M/Enterprise Manager product, to automate, monitor, and intervene in your production environment. This book is intended for all users of Control-M/Enterprise Manager (Control-M/EM).

The book is organized into parts that reflect the logical progression of high-level tasks. Each part contains the chapters that organize the individual implementation tasks into related chapters. To use the information in this book most effectively, read the chapters in the order in which they are presented.

NOTE

- BMC Software recommends that before you use this book, you become familiar with the concepts presented in the *Control-M Concepts Guide*.
- This book assumes that Control-M is already installed and initially configured. The installation and configuration tasks are described in the *Control-M Installation Guide*.
- This book does not discuss administrative tasks (for example, daily maintenance). Those tasks are described in the *Control-M Administrator Guide*.

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The software also offers online Help. To access Help, press **F1** within any product, or click the Help button in graphical user interfaces (GUIs).

Conventions

This book uses the following special conventions:

- All syntax, operating system terms, and literal examples are presented in this typeface.
- Variable text in path names, system messages, or syntax is displayed in *italic* text:

  testsys/*instance*/*fileName*
- The symbol => connects items in a menu sequence. For example, **Actions => Confirm** instructs you to choose the **Confirm** command from the **Actions** menu.

Syntax statements

The following example shows a sample syntax statement:

```
COMMAND KEYWORD1 [KEYWORD2 | KEYWORD3] KEYWORD4={YES | NO} fileName...
```

The following table explains conventions for syntax statements and provides examples:

Item	Example
Items in italic type represent variables that you must replace with a name or value. If a variable is represented by two or more words, initial capitals distinguish the second and subsequent words.	*alias* *databaseDirectory* *serverHostName*
Brackets indicate a group of optional items. Do not type the brackets when you enter the option. A comma means that you can choose one or more of the listed options. You must use a comma to separate the options if you choose more than one option.	[*tableName*, *columnName*, *field*] [-full, -incremental, -level] (Unix)
Braces indicate that at least one of the enclosed items is required. Do not type the braces when you enter the item.	{*DBDName* | *tableName*} UNLOAD device={disk | tape, *fileName* | *deviceName*} {-a | -c} (Unix)

Item	Example
A vertical bar means that you can choose only one of the listed items. In the example, you would choose either *commit* or *cancel*.	`{commit	cancel}`  `{-commit	-cancel}` (Unix)
An ellipsis indicates that you can repeat the previous item or items as many times as necessary.	*columnName* . . .

Part 1

Getting started

This part presents the following topics:

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Chapter 1

Introduction to Control-M/Enterprise Manager

This chapter presents the following topic:

Automating your production jobs with Control-M/EM 23

Automating your production jobs with Control-M/EM

With Control-M/Enterprise Manager, you can automate the scheduling and processing of your production jobs. Its main GUIs are Control-M/Desktop and the Control-M/Enterprise Manager window (simply called Control-M/EM).

To automate your production environment, perform the following tasks:

- Model your production job flow by using job processing definitions

  Job processing definitions provide Control-M with the instructions for scheduling, submitting, and performing post-processing tasks of the jobs in your production environment. This book describes how to use Control-M/Desktop to create job processing definitions and other needed entities.

- Automate job ordering

  After job processing definitions have been defined for your production jobs, you perform several tasks to transition your definitions to production. As part of this transition, you can use a feature called New Day processing to automate the ordering of jobs each day.

- Monitor (and where necessary, intervene in) the processing of your production jobs

  To ensure that everything is running smoothly, you can monitor job processing, and if problems arise you can intervene effectively. Generally, monitoring by exception (that is, checking problems or potential problems rather than viewing the entire system) is the most effective way to monitor your production jobs.

- Analyze (and optimizing) job processing in your production jobs

  After your production jobs have been automated, you can ensure that processing is maximized by using analysis tools to identify areas that can be improved, such as resource allocation, workload balancing, and so on.

This book describes how to use the GUIs of Control-M/EM to automate the scheduling and processing of your production jobs.

Where to go from here

- Continue with Chapter 2, "Working with Control-M/Desktop and Control-M/EM," which explains how to start Control-M/Desktop and Control-M/EM, and provides the details that you need to navigate, understand, and effectively use these interfaces.

- For details about defining the entities needed for automating the production environment, especially job processing definitions, see Part 2, "Defining the production environment."

- For details about how to transition your definitions into production and automating your production environment, see Part 3, "Moving to production."

- For details about monitoring, and when necessary, intervening in, your production environment after it is automated, see Part 4, "Monitoring and intervening in production."

- For details about helpful tools (including reports) for analyzing and optimizing your production environment, see Part 5, "Analyzing and optimizing the production environment."

Chapter 2

Working with Control-M/Desktop and Control-M/EM

This chapter provides basic information you need to start, understand, navigate, and manipulate Control-M/Desktop and Control-M/EM features. 26
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This chapter provides basic information you need to start, understand, navigate, and manipulate Control-M/Desktop and Control-M/EM features.

- Control-M/Desktop enables you to create and edit job processing definitions, one of the first tasks that you are likely to perform. Control-M/Desktop also enables you to define other entities such as tables, job templates and calendars. After defining these entities, you can use Control-M/Desktop to move entities that you have defined into production.

- Control-M/EM enables you to monitor and intervene in job processing in the production environment. The selection of jobs you view is called a ViewPoint. ViewPoints are discussed in Chapter 20, "Selecting jobs to monitor."

You should become familiar with the information in this chapter before using Control-M/Desktop to define job processing definitions (and other entities), and before using Control-M/EM to monitor and intervene in your production environment.

Starting Control-M/Desktop

1 Do one of the following:

- From Control-M/EM GUI, select **Tools > Control-M/Desktop** and go to step 3**.**

- From the **Start** menu, navigate to **BMC Control-M > Control-M Enterprise Manager > Control-M Desktop.**

2 Enter your user name and password, select the Control-M/EM GUI Server to which you want to connect, and click **Login**.

If change password fields are displayed, your password is soon due to expire. Fill in your new password, and then confirm it.

TIP

If the GUI Server to be selected is not listed, contact your Control-M administrator.

The Control-M/Desktop window is displayed.

3 If the Load Jobs dialog box is displayed (which depends on configuration options), to load jobs from Control-M/EM into Control-M/Desktop:

A Select the jobs and tables to be loaded, and click **Load**, and confirm if necessary.

If you select a nested Sub-table, all of the associated parent tables will be loaded as well.

The Load Table Results dialog box displays the results of the load operation.

B Close the Load Table Results dialog box.

NOTE

If tables you select are locked, notify the user named in the **Locked by** column, or wait until the tables are unlocked.

Connecting to a different GUI Server

Control-M / Desktop enables you to connect to a different GUI Server at any time. (To check to which GUI Server you are currently connected, choose **Tools => Connection => Connection Properties.)**

To change connection to a different GUI Server

1 In Control-M / Desktop, choose **Tools => Connection => Connect with Different Properties**.

2 Enter your user name and password, and select the GUI Server to which you want to connect.

3 To specify values other than the defaults for host name, port number and Secured Socket Layer usage, click **Advanced**, and fill in the details.

4 Click **Login**.

Starting Control-M/EM

1 Do one of the following:

- From Control-M / EM GUI, select **Tools > Control-M/Enterprise Manager** and go to step 2**.**
- From the **Start** menu, navigate to **BMC Control-M > Control-M Enterprise Manager > Control-M Enterprise Manager GUI.**

2 Enter your user name and password, select the Control-M/EM GUI Server to which you want to connect, and click **Login**.

If change password fields are displayed, your password is soon due to expire. Fill in your new password, and then confirm it.

TIP

If the GUI Server to be selected is not listed, contact your Control-M administrator.

3 To display jobs that are in the production environment

A Choose **File => Open ViewPoint**.

B In the Open ViewPoint dialog box, select the ViewPoint to be used for displaying jobs.

C To filter jobs that will be displayed in the selected ViewPoint, click Dynamic Filter in the Open ViewPoint dialog box.

Then do the following actions in the Dynamic Filter dialog box:

- Optionally, select your previously defined Filter Preset.
- Fill in the fields for filtering. For details, see "Defining dynamic filters" on page 240.
- Click **OK** in the Dynamic Filter dialog box.

D Click **OK** in the Open ViewPoints dialog box to open the ViewPoint in the Control-M/EM window and display the selected jobs.

NOTE

To resolve connectivity problems between the Control-M/EM, Control-M/EM server and Control-M/Desktop, see "Connectivity problems" on page 395 of the Troubleshooting appendix.

Understanding the Control-M/Desktop and Control-M/EM layout

Control-M / Desktop (Figure 1) and Control-M / EM (Figure 2) have very similar layouts.

Figure 1 Control-M/Desktop displaying a draft

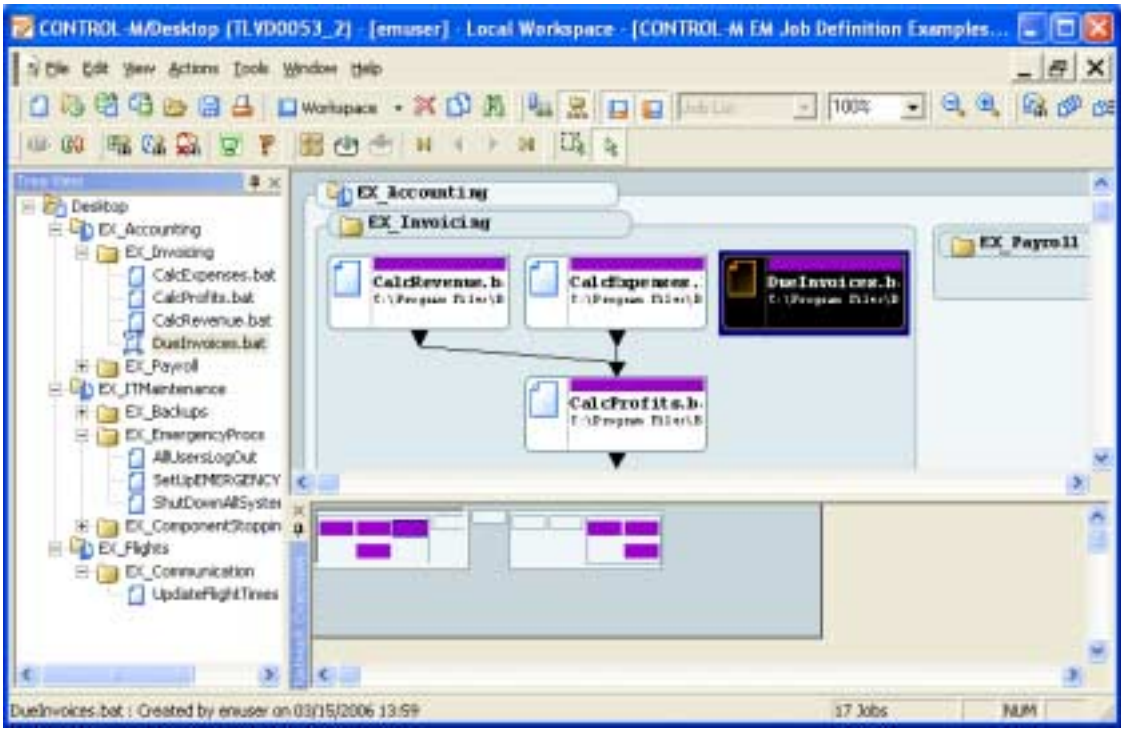
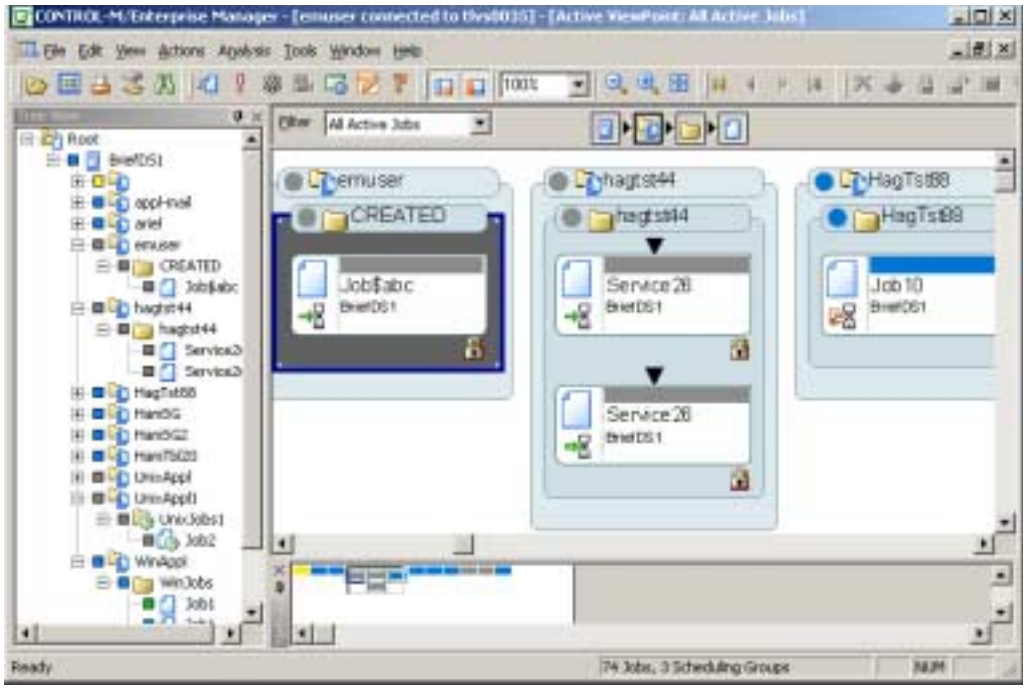


Figure 2 Control-M/Enterprise Manager displaying a ViewPoint



The Control-M / Desktop and Control-M / EM windows contain the following sections:

- navigation tree pane — lists entities according to the selected hierarchy
- main pane (work area) — displays entities in a flow diagram format, a job list format, or a Gantt chart format (available only if Control-M / Forecast is installed)

  You can also use the main pane to display a job editing form or a table.
- Net Overview pane — displayed only when a flow diagram is displayed, this pane displays a “thumbnail” version of the flow diagram and highlights the part of the flow diagram currently displayed in the main pane.

  Use this display for quick navigation in the flow diagram.

In addition, if Control-M / Forecast is installed, you can display the What-If Scenario and Forecast Summary panes. For more details, see Chapter 19, “Planning production with Control-M / Forecast.”

In Control-M/Desktop, the title bar identifies the type of workspace in which you are working (and in the local workspace, the name of the draft). The background color (customizable) of the panes also indicates the type of workspace.

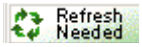
NOTE

You can customize the display for both Control-M/Desktop and Control-M/EM. For details, see Appendix A, "Customizing the interfaces."

Understanding the flow diagram

The flow diagram shows you at a glance information, such as entity type, relationships, and statuses.

NOTE

Control-M/EM displays a refresh needed icon 

in the toolbar if the flow diagram needs a refresh due to production changes. Click the icon to perform the refresh

In the flow diagram, components of the environment (definition environment or active environment) are represented by node boxes. The information that is displayed in a node varies depending on the type of node and on customization options.

Table 1 Node and tree icons

Symbol	Information
	Desktop (root) node
	Control-M
	Application
	Group
	Table
	Job
	Locked table
	Cyclic job (**Note:** Cyclic indicators are also displayed in forecasts generated by Control-M/Forecast.)

Symbol	Information
	Job under a BMC Batch Impact Manager service
	Control-M is disconnected
	Condition node
	SMART Table
	Job in a SMART Table
	Locked SMART Table

Table 2 Additional icons in Control-M/EM only

Symbol	Information
	Job is executing
	Job ended OK
	Job ended NOT OK
	Deleted job

Symbol	Information
	Job is held
	Job is waiting for a condition, resource or other execution requirement to be satisfied
	Job is waiting for a manual confirmation
	Job state changed to unknown

NOTE

Free, Late, and On Request jobs do not show a visible change in the node appearance.

Nodes for Started Tasks and Emergency jobs are relevant for z/OS jobs only. For more information about these job types, see the *Control-M for z/OS User Manual*.

Understanding Control-M/EM job node colors

Table 3 indicates the meaning of default colors that are used in the title bar in job nodes in Control-M/EM.

Table 3 Job status indicated color (Part 1 of 2)

Color	Status	Meaning
Gray	**Wait Condition**	■ Job is waiting for the specified date, time, or In prerequisite condition. ■ **Note:** Jobs with this status might have any of the following statuses in Control-M/Server: — CYCLIC — WAITTIME — WAIT_ODAT — POST_ODAT
Green	**Ended OK**	Job processing finished successfully.
Yellow	**Executing**	Job is executing.
Blue	**Wait Resource**	Job is waiting for Control or Quantitative resources.
Blue	**Wait Nodes**	Job is waiting for nodes resources to become available for job submission.
Blue	**Wait Workload**	Job is waiting due to restrictions enforced by workload policy rules.

Table 3 Job status indicated color (Part 2 of 2)

Color	Status	Meaning
Pink	**Wait User**	Job is waiting for user confirmation. **Note:** Jobs with this status are assigned WAITCONFIRM status in Control-M/Server.
Red	**Ended Not OK**	Job processing finished unsuccessfully. **Example:** Agent platform on which the job was running was changed to disabled by a user.
White	**Unknown**	Communication with the Agent platform or agentless remote host was interrupted.
Purple	**Not in AJF**	Job is not in the Active Jobs file. This status is displayed only in archived ViewPoints.

Understanding colors used in nodes above the job node

The color of a high-level node (that is, any node above the job node) is determined by the status of its descendant nodes:

- If all descendant nodes have the same status, the title bar of the high-level node is the same color as its descendants.
- If the descendant nodes have different statuses, the color of the high-level node is as described in Table 4. In this case, vertical color bars at the bottom of the node indicate the proportional status distributions of descendant nodes.

EXAMPLE

The following application node has some jobs that have Ended OK and some that have Ended Not OK.

Table 4 High-level node status colors - Defaults

Color	Description
White	At least one job has a status of Unknown.
Red	At least one job has a status of Ended Not OK.
Pink	At least one job has a status of Wait User.
Blue	At least one job has a status of Wait Resources, Wait Nodes or Wait Workload.
Yellow	At least one job currently has a status of Executing.
Green	All jobs have the status Ended OK.

NOTE

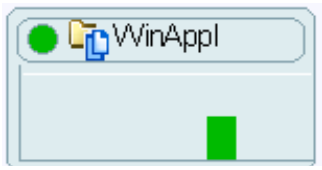
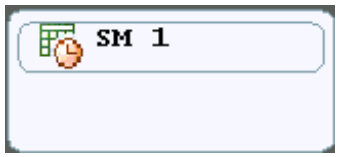
Emergency jobs are not considered when determining the basic color of a node.

The node color of a SMART Table is determined by both the status of the jobs in the table and the SMART Table itself. The status is indicated by the color of the clock image in the SMART Table icon ( ). The title bar display color is the color representing the greatest degree of urgency.

Examples

Table 5 presents examples of nodes.

Table 5 Sample node types

Node type	Sample node
Application	
SMART Table	
Regular job	
Cyclic job (currently executing) **(Note:** Cyclic indicators are also displayed in forecasts generated by Control-M/Forecast.)	

Recognizing job dependencies

Job dependencies are established through prerequisite conditions (In prerequisite conditions and Out prerequisite conditions) in job processing definitions (see the *Control-M Concepts Guide*).

Job dependencies in the flow diagram are represented by lines and arrows connecting job nodes, for example . (These lines can even indicate dependencies between jobs in different Control-Ms.) The direction of arrows at the ends of the lines indicates the flow direction (predecessor and successor relationship) of the connected nodes.

Dotted lines between two jobs indicates a conditional link between the two jobs (for example, optional In conditions defined using OR logic).

An arrow without a connecting line at the top or bottom of a node indicates one of the following condition types:

- Arrow at the top — a manual In prerequisite condition. This condition does not get added automatically by another job, but rather must be added manually (see "Manually indicating satisfied conditions" on page 270).
- Arrow at the bottom — The Out prerequisite condition has no corresponding In condition or job dependent upon the condition.

In Control-M/EM, the connecting lines between conditions are

- green —condition exists (active)
- black — condition does not exist yet (inactive)

Adjusting the display

You can adjust the Control-M/Desktop and Control-M/EM display.

Returning panes to their original positions

You can adjust and move panes in the window by clicking and dragging.

To return panes to their original positions

Choose **View => Dockable Windows => Reset to Default Layout**.

Changing the data display format

You can choose from the following the data display formats:

- flow diagram
- list
- Gantt chart (available only if Control-M / Forecast is installed)

To change the data display formats

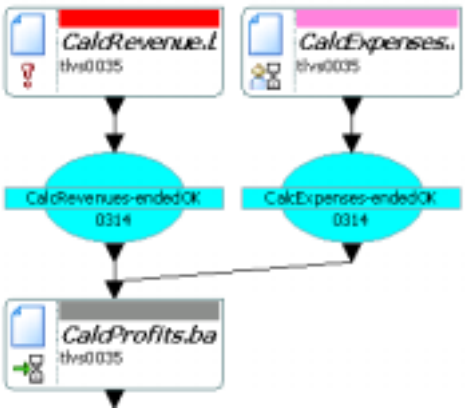
Choose **View => Flowdiagram, View => Job List,** or **View => Gantt**.

For more details about the Gantt chart, see Chapter 19, "Planning production with Control-M / Forecast."

Displaying dependency names in a node

By default prerequisite conditions are not displayed in the flow diagram; only the dependencies they define are indicated, by the lines and arrows running between nodes. However, you can customize the defaults so that the flow diagram also displays prerequisite conditions as condition nodes. This view is most useful when viewing a small number of jobs.

Figure 3 Condition node in the flow diagram



To display (or hide) job dependency nodes

1 With the flow diagram displayed, choose **Tools => Options**.

2 Select the Links pane in the Flowdiagram Options dialog box, and then select (or clear) the **Display condition nodes** check-box.

TIP

To see dependency names for a particular node, you do not need to display dependency name nodes in the flow diagram. Instead, click a top or bottom arrow of the connecting line between nodes to flash the dependency names.

Focusing on different level nodes (stepping in and stepping out)

You can choose to view only one particular hierarchy node level in the definition environment — for example, you might want to view only Control-M nodes.

Changing to a higher level (for example, from Job level to Group level), is called **stepping out**; changing to a lower level (for example, from Group level to Job level), is called **stepping in**.

To change the display to different node level in the flow diagram

In the pop-up menu for the entity, choose

- **Step In** — to display a lower node level
- **Step Out** — to display a higher node level

Performing other display adjustments

Table 6 describes a number of other display adjustments you can perform:

Table 6 Additional display adjustments (Part 1 of 2)

Adjustment	Step
to display or hide sub-nodes (expand or collapse the display)	Choose **Collapse** or **Expand** from the selected node's pop-up menu. (You can select multiple nodes and then perform a single Expand or Collapse operation.) **Tip**: This operation is not available when condition nodes are displayed. In this case, use the Step In (or Step Out) operation to display different hierarchy levels.
to display a node's job processing definition (or SMART Table)	Double-click the node in the navigation tree or the flow diagram.

Table 6 Additional display adjustments (Part 2 of 2)

Adjustment	Step
(Control-M / Desktop only) to change the hierarchical arrangement of displayed data, between application hierarchy and table hierarchy	In Control-M / Desktop, choose **View => Hierarchy** and then choose either the **Application/Group/Table/Job** hierarchy or the **Data Center/Table/Job** hierarchy. **Note:** If you change the hierarchy when displaying data in list format, the components that are displayed depend on the node you select in the navigation tree
(In the List format in Control-M / Desktop only) to alternate views between a hierarchy view and a job list view	1. With the List format displayed in Control-M / Desktop, select **Job List** or **Hierarchy List** in the selection field in the Control-M / Desktop toolbar. 2. To display different components in the hierarchy list or the job list, select appropriate node in the navigation tree. **Note:** For an item selected in the tree view, the ■ hierarchy view shows all Control-Ms, applications, groups, number of Sub-tables and jobs, in hierarchical order ■ job list view shows all related jobs and Sub-tables, in no hierarchical order

Filtering the jobs displayed in a Control-M/Desktop draft

By default, all the jobs in the current draft are displayed, but Control-M / Desktop enables you to filter which job are displayed.

To filter jobs displayed in the draft

1 In Control-M / Desktop, choose **View => Filter**.

2 In the Filter dialog box, define selection criteria for the filter. An **AND** relationship applies to multiple criteria; a job must satisfy all specified criteria to match.

When defining criteria, consider the following points:

- Most fields correspond to fields in the job editing form. For a description of the fields, see the *Control-M Parameter Guide*.
- Certain fields correspond to values for Control-M parameters (for example, **August** is a value for parameter **MONTHS**). To specify such criteria, set the value to **true** (for example, **August = true**).

- The **LIKE** operator treats * and ? characters in the value as wildcards; the = operator treats * and ? characters in the value as literals.

3 In the Action area, select how the criteria should be applied to the draft:

- Only jobs matching the specified criteria should currently be included in the filter (**Set Matching jobs to be the current filter**). This option is especially useful when no other criteria are currently applied or you want to override previously applied criteria.

- Jobs matching the new criteria should be added to or removed from the current filter. These options are especially useful for adjustments when other criteria are currently applied criteria. The **Remove matching jobs from the current filter** option is also useful for defining criteria for exclusion rather than inclusion.

- The full draft should be displayed (that is, the filter should be nullified).

TIP

Because the relationship between multiple criteria specified in the dialog box is **AND**, to create criteria using an implied **OR** relationship, do the following steps:

1. Define the first criterion or first set of **AND** criteria, and select **Set Matching jobs to be the current filter**.

2. Then, define an **OR** criterion (or set of criteria, if they have an **AND** relationship between them), and select **Add matching jobs to the current filter**. This set is added to the filter (implying an **OR** relationship between it and the previous set). Repeat this step as needed.

4 Click **OK** to filter the draft according to the specified criteria.

Draft filters are not saved for future use. When you close the draft, the filter definition is lost.

Arranging the Control-M/Desktop flow diagram display

In Control-M / Desktop, after you have performed many changes to the flow diagram, (for example, adding or modifying job dependencies), you might want to have Control-M / Desktop rearrange the flow diagram to more neatly display the job flow.

To arrange the display

In Control-M / Desktop, right-click anywhere in flow diagram (except on a job node), and select **Arrange All** from the menu.

Changing click and drag in Control-M/Desktop to define dependencies

Normally, you click and drag the mouse to select items. In Control-M / Desktop, however, you can also click and drag between nodes in the flow diagram to establish dependencies. Therefore, before performing a click and drag, you must let Control-M / Desktop know your purpose, by selecting the appropriate node.

To set the mode of click and drag so that it performs node selection or dependency definition

Do one of the following actions:

- To set the flow diagram to **Selection** mode (so you can select multiple nodes), click .
- To set the flow diagram to **Definition** mode (so you can create dependencies), click .

NOTE

Definition mode is the default mode when Control-M / Desktop is started.

Creating workspaces and loading jobs into Control-M/Desktop

In Control-M / Desktop, you need to create a workspace or draft in order to load jobs and tables. You can create and open multiple workspaces on the Control-M / Desktop in online, local, or forecast modes. For more information, see "Connecting to a different GUI Server" on page 27.

To create workspaces or drafts

Do one of the following:

- To create an Online workspace, choose **File => New => Online Workspace**.
- To create a local workspace, choose **File => New => Local Workspace**.
- To open an existing draft in the local workspace, choose **File => Open**.

To load jobs into your workspace

1 Choose **File => Load jobs from Control-M/EM**.

2 In the Load Jobs dialog box, select the tables and jobs, and click **Load**. Confirm the load if necessary.

When loading a nested Sub-table, all associated parent tables will be loaded as well.

3 When the list of loaded job is displayed, close it.

Navigating in the flow diagram

You can select multiple nodes, but only one of them can be your current (focused) node. You can navigate among the multiple selected nodes to make a different one your focused node.

To navigate to, and display, a node in the flow diagram

Click the corresponding node in the navigation tree or net overview.

To navigate to a predecessor or successor node

1 In the flow diagram or navigation tree, display the pop-up menu for the node and select **Branch Menus**. Then select **Predecessor** or **Successor**.

2 In the submenu, select the target node (job, group, or condition), which is then selected and displayed as the current node.

To find jobs in the flow diagram that conform to specific criteria

1 In Control-M / Desktop or Control-M / EM, select **Edit => Find Jobs**.

2 In the Find Jobs dialog box, fill in the criteria (you can specify pattern-matching strings in certain fields). An **AND** relationship applies to multiple criteria; a job must satisfy all specified criteria to match.

3 To save the specified Find criteria for future use, choose **Presets => Save** and assign a name in the Save Preset dialog box, and click **OK**.

4 In Control-M/Desktop, click **Select All** to select all nodes matching the criteria, or click **Find Next** to select the first node that matches the criteria, and click **Find Next** again to select the next node that matches the criteria. In Control-M/EM, click **Find** to select all nodes matching the criteria.

To change the focus (navigate among multiple selected nodes)

Click the appropriate navigation button (First), (Previous), (Next), or (Last), or use the **View => Toggle Selection** menu.

Identifying predecessor and successor jobs

Using the Network Neighborhood feature, you can identify predecessor and successor jobs of a selected job. In Control-M/EM, this feature also generates a list of jobs and displays their details, and you can perform other operations on the list.

NOTE

To navigate directly to a predecessor or successor node without generating detail lists, use the branch menus options. For details, see "To navigate to a predecessor or successor node" on page 41.

To list predecessor or successor jobs and their details

1 In the flow diagram, expand all relevant group nodes so all jobs to be included are visible. Ensure that Condition nodes are not displayed.

2 In the flow diagram or the navigation tree, select the relevant job or SMART Table node.

3 In the **View** menu, choose **Neighborhood**.

4 In the Network Neighborhood dialog box, specify the following information:

- In the **Direction** field, select the node relationship:
  - To identify nodes branching in all directions from the selected node, select **Radial**.
  - To identify the predecessor nodes of the selected node, select **Predecessor**.
  - To identify the nodes dependent on the selected node, select **Dependent**.
  - To identify the predecessor and dependent nodes above and below the selected node, select **Direct Relationship**.

- In the **Radius** field, specify the number of nested node levels (not number of nodes) to branch out from the selected node. Valid values: **1-99999**.

5 Click **Find** to select the applicable job nodes in the flow diagram. (The number of applicable job nodes is listed in the dialog box.)

In Control-M/EM, a display area opens at the bottom of the dialog box and displays the list of those jobs and their details.

TIP

If the details display area does not open in Control-M/EM, click **Details** (which alternately displays and hides this display area).

6 Either close the dialog box or do one of the following:

- In Control-M/Desktop, to save the data in a report, click **Save Report** and fill in the details.
- While the Network Neighborhood details list is displayed in Control-M/EM, you can perform the following tasks on that list.

Task	How to
display or hide an item count at the bottom of the Details list	Click **Item Count** in the pop-up menu for any job listing.
locate a listed job in the flow diagram	Click **Find** in the pop-up menu for the job listing.
open the Job Editing form for a listed job	Double-click the job listing.
export the details of the listed jobs to a comma-delimited (CSV) file	Click **Export to File** in the pop-up menu for the job listing.
create (and view) a text report containing the details about the listed jobs	Click **Create Report** to save this information as a file. (To open the saved report in your default text editor, click **Show Report**.)
display the listed jobs in their own ViewPoint	Click **Open ViewPoint**. For information on these ViewPoints, see "Properties of ViewPoints based on dependent jobs" on page 261.

Printing the flow diagram

BMC Software recommends that you perform a Print Preview before printing the flow diagram. When previewing a printout, the following hints might be useful:

- Marks on the rulers at the left and top areas of the Print Preview window, which are designed to help you locate nodes, indicate relative distance (not inches or centimeters).

- Columns are labeled alphabetically from left to right, beginning with **A**. Rows are labeled numerically from top to bottom, beginning with **0**.
- Pages are labeled as follows:
  - Alphabetic labels indicate the horizontal sequencing.
  - Numeric labels indicate the vertical sequencing,

EXAMPLE

- **B.A** corresponds to the first column on the second page horizontally.
- **3.2** corresponds to the second row on the third page vertically.

- You can include the rulers in the printout.
- You can include an index of displayed nodes (only when rulers are also printed).
- You can print the entire flow diagram or a selected page range.

Changing your password

When your password is soon due to expire, the login dialog box of the Control-M windows (Control-M/Desktop, Control-M/EM, Control-M Reporting Facility, and Control-M Configuration Manager) will display fields that enable you to change your password.

To change your password at any other time, you must issue the request through the Control-M/EM or Control-M/Desktop windows.

Password changes made in one application window (for example Control-M/EM) automatically apply to the other application windows.

To change your password

1. If the change password fields are not already displayed, in the Control-M/EM or Control-M/Desktop window, choose **Tools => Change Password**.
2. Fill in your current and new passwords, and then confirm the new password.
3. Click **OK**.

NOTE

Alternatively, you can change passwords using the User Authorizations window, but this is generally not recommended unless you are changing other password criteria, or changing the passwords for other users. For more information, see the *Control-M Administrator Guide*.

Assigning authorizations

Control-M/EM contains a security mechanism called the Authorization facility. Using the Authorization facility, the Control-M/EM administrator can limit the entities that a user is authorized to view or change. For example, a user can be limited to modifying resources and jobs that relate to a specific Control-M installation.

Authorization facility for limiting access to entities

Access to the following entities and actions can be limited:

- Jobs that the user can view or modify. This affects usage of all windows that rely on access to information originating in the active environment. For example, limiting the view to jobs from a single Control-M installation limits the view in the Control-M/EM ViewPoint window.
- Control resources, quantitative resources, global conditions, and prerequisite conditions that the user can view or change. This does not relate to resources and conditions displayed in the Job Details window. For example, a user may see that a job is waiting for a prerequisite condition in the Job Details window, but not be authorized to create this condition using the Prerequisite Condition window.
- Calendars and tables that the user can view or modify. Limiting access to tables also determines which tables and jobs the user can order or force.
- ViewPoint components that the user can use or modify.
- Administrative responsibilities (such as Control-M definitions and User Authorizations) and Command Line Interface (cli) utility privileges.

Control-M/EM security can be defined at the user level and group level. Users can be associated with multiple groups.

The following sections provide an overview for assigning authorizations to users. For more information, see the descriptions of the respective tabs in "Tabs in the User and Group Authorizations windows" on page 50.

Log on procedure

User names are authenticated in Control-M/EM according to the AuthenticationMethod system parameter and the DirectoryServiceAuth system parameter settings. These parameters determine whether Control-M/EM uses internal or external authentication. For more information about the DirectoryServiceAuth system parameter, see the *Control-M Administrator Guide*.

- If the AuthenticationMethod system parameter is null, the internal Control-M/EM authentication is used.

- If the AuthenticationMethod system parameter has a value, the specified external authentication plug-in is used.

- If the DirectoryServiceAuth system parameter is set to On, the AuthenticationMethod system parameter is ignored. The log on procedure must authenticate the identifiers of the user against external LDAP directories. Users who are not defined in the Control-M/EM Authorization Facility must belong to groups in the LDAP directory. These LDAP groups must be associated with Control-M/EM authorization groups through the Control-M/EM Authorization Facility.

Control-M/Forecast security

Control-M/Forecast conforms to all Control-M/EM security rules and definitions so you can view only the scheduling components for which you are authorized.

Forecast reports can be run only by the Control-M/EM administrator.

Tables, Calendars, Resources, Conditions, and Owners

A user has an authorization if that authorization is granted to any group of which the user is a member. Authorizations specified for a user in the panels of the User Authorizations window are in addition to or supersede the authorizations specified for that user in the panels of the Group Authorizations window.

EXAMPLE

User **JimA** belongs to group **Acct**. Group **Acct** has **Browse** authority for all tables. **JimA** has **Update** authority for Control-M **Figaro** and **Marius** tables. In addition, **JimA** has **Update** authority for jobs on Control-M **Figaro** and **Marius** in which **Bob** is the Owner and the NodeID or Group is Finance. **JimA** can update tables for **Figaro** and **Marius** that have jobs whose Owner is **Bob** and Node ID or Group field is **Finance**, but can only view tables for other Control-M installations.

Privileges

Privilege authorizations include:

- access to the Control-M Configuration Manager and its features, Alerts, and Archived ViewPoints data
- usage of the cli utility
- ability to define Collections, Hierarchies, Filters, ViewPoints, and Authorizations

By default, a user has the highest authorization defined for any group of which he is a member. However, group authorizations for a user are superseded by authorizations specified in the **Privileges** panel of the User Authorizations window with any Access Level other than Default.

EXAMPLE

User **JimA** belongs to group **Staff**. Group **Staff** has **Update** authority for all Collections, Hierarchies, Filters, and ViewPoints but only **Browse** authority for Authorization definitions, Communication, Alerts, and Archived ViewPoints. **JimA** is defined with **Default** authority for all definitions and **Update** authority for Communication. **JimA** can create and modify ViewPoints as well as add, modify, and delete Control-M installations from the Control-M/EM database.

Tasks that may require both Control-M and Control-M/EM Authorizations

Many operations require authorizations in both Control-M/EM and Control-M. For example, to Hold a job, the user must be authorized in Control-M/EM to access that job and authorized in Control-M to Hold jobs for the job owner. For more information, see the *Control-M Administrator Guide*.

Authorizations window

The Authorization window has separate panels for users and groups. The Users panel enables you to add, modify, copy, or delete a user whose authorizations can be configured. The Groups panel enables you to add, modify, copy, or delete a group whose authorizations apply to members of the group.

NOTE

Control-M/EM users with **Full** access can add, modify, copy, or delete user and group authorizations. Users with **Browse** access can view authorizations. For more information, see Table 17 on page 59.

To access the User or Group Authorizations window

1. Log on to Control-M/EM or Control-M/Desktop.

2. Choose **Tools => Authorizations**. The **Users** tab is displayed.

Authorizations window – Users tab

The **Users** panel lists the system's users. Fields in this panel are described in Table 7.

Table 7 Authorizations window – Users tab fields

Field	Description
Filter	Select this check box to enable the **User Name** filter.
User Name text box	Specify a user name or pattern (for example, **adm***). Click **Apply** to apply the filter. Click **Clear** to erase the contents of the text box.
Name	Control-M/EM logon name of the user to whom the authorization refers. Names listed satisfy the requirements of the filter, if any.
Full Name	Full name of the user.
Description	Description of the user.

To define authorizations for a group of users, click the **Groups** tab. The **Groups** tab lists group names and descriptions of the groups to which users can be assigned. Fields in this panel are described in Table 8.

Authorizations window – Groups tab

Table 8 Authorizations window – Groups tab fields

Field	Description
Filter	Select this check box to enable the **Group Name** filter.
Group Name text box	Specify a group name or pattern (for example, **adm***). Click **Apply** to apply the filter. Click **Clear** to erase the contents of the text box.
Name	Group name. Groups listed satisfy the filter requirements, if any.
Description	Description of the group.

To filter data in the Users (or Groups) tab of the Authorizations window

To limit the data displayed in the **Users** (or **Groups**) tab, choose the **Filter** check box, specify a name or pattern in the **User** (or **Group**) **Name** text box, and click **Apply**. For example, choose **Filter** and specify **adm*** in the **User Name** text box to limit the display to records containing user names that begin with **adm**...

See the information about specifying pattern-matching strings in Appendix C, "Formats, values and functions."

Click **Clear** to remove the specified filter string and display user or group information without using any filter.

To define, copy, or assign authorizations to a user or group

1 In the **Users** or **Groups** tab of the Authorizations window, click **New**, or choose an existing user or group and click **Copy**. The New Name dialog box is displayed.

NOTE

When copying an existing group, the users that belonged to the existing group are ***not*** associated with the new group.

When copying an existing user, the groups the existing user belongs to ***are*** associated with the new user but the existing password is ***not*** copied. The password for the new user can be specified by using the **General** panel of the User Authorizations window.

2 Specify a name for the new user or group in the New Name dialog box and click **OK**. A new user is displayed in the **User** panel.
A new group is displayed in the **Group** panel.

To modify authorizations for a specific user or group

1 Select the user name in the **Users** tab or the group name in the **Groups** tab.

2 To modify authorizations, click **Update**. The User Authorizations or Group Authorizations window is displayed.

3 To add a user to one or more groups, or delete a user from one or more groups, follow the steps described under "Member Of tab actions" on page 52.

To delete a specific user or group

1 Select the user or group and click **Delete**.

2 A confirmation window is displayed. Click **OK** to confirm the deletion.

NOTE

New, modified, copied, and deleted authorizations of a user (and groups the user is a member of) do not take effect until the user logs off of all Control-M/EM sessions.

If user authorizations are changed in Control-M/EM at sites with BMC Batch Impact Manager, you must restart the BMC Batch Impact Manager Server for the changes to take effect in the BMC Batch Impact Manager Web Client. If this is not done, a user whose permissions have been changed or revoked can continue to use the BMC Batch Impact Manager Web Client to perform actions he was previously authorized to perform until the BMC Batch Impact Manager Server is restarted.

Tabs in the User and Group Authorizations windows

Table 9 Tab descriptions

Tab	Purpose
General	Provides logon data about users (or lists members of a group).
Member Of	[User Authorizations window] Matches users with groups.
Active	Jobs a user (or member) can access and actions he can perform.
Privileges	■ Whether the Control-M Configuration Manager can be accessed and used, Alerts and Archived Viewpoints can be viewed, and the user (or member) can use the Command Line Interface (**cli**). ■ Actions that can be performed on Collections, Hierarchies, Filters, ViewPoints, and Authorization screens.
Tables	Tables a user (or member) can access in Control-M/Desktop, authorization levels for the tables, and whether jobs or tables can be ordered or forced.
Prerequisite Conditions	Prerequisite conditions that a user (or member) can access.
Control Resources	Control resources that a user (or member) can access.
Quantitative Resources	Quantitative resources that a user (or member) can access.
Global Conditions	Global conditions that a user (or member) can access.
Calendars	Calendars that a user (or member) can access.
Owners	Jobs in tables that a user can access.
Services	Authorizes a user to view services, perform job actions, order, hold, and release services.

Select the panels, complete them, and click **OK** to add, update, or delete user (or group) authorizations in the Security database. Each panel is described below.

User Authorizations window – General tab

Table 10 User Authorizations window – General tab fields

Field	Description
User name	Name of user to whom authorization refers. Required. **Note:** Blanks are not permitted in this field.
Emergency User	To provide a user with the ability to circumvent external authentication, enable the **Emergency User** checkbox. When this checkbox is enabled, you must enter a value in the **Password** and **Confirm Password** fields. **Note**: The **Emergency User** checkbox is only displayed when external authentication is enabled. For more information, see the *Control-M Administrator Guide*.
Full Name	Full name of the user.
Description	Description of the user.
Password	Password of the user. The value is not displayed. **Note**: The Password field is disabled when Active Directory authentication is used. For more information, see the *Control-M Administrator Guide*.
Confirm Password	Password confirmation field. The value is not displayed.
Password never expires	If selected, the password does not expire automatically. Default: Selected. **Note:** When migrating from Control-M/EM version 6.0.*xx* or 6.1.*xx*, this option is selected for each user.
Password will expire every *n* days	If selected, the password expiration date is computed and displayed. ***n*** defaults to the value of system parameter PasswordLifetimeDays. The administrator can change the value of ***n*** for this user. Default: this option is not selected.
User must change password at next login	If this check box is selected, the current password expires and the user must change the password at the next logon.
Password expiration date	Date when password expires. Read-only field.
Lock account	Select to manually lock the account. Clear to manually unlock the account. If selected, a message similar to the following is displayed: `Account was locked by: user on: mm/dd/yyyy hh:mm:ss AM|PM`

NOTE

If a Control-M/EM administrator uses the Authorization dialog to set a password, the password complexity, length, and history requirements are ignored.
If the UserChangePassword system parameter is set to **1** (its default value), all users can change their own password using the **Tools=> Change Password** option. If this parameter is set to **0**, only users who have **Full** or **Update** permission to modify security definitions can change their own password.

Group Authorizations window – General tab

This tab describes the Authorization group and lists each member of the group. Generally, each member of a group has the same authorizations to view or modify entities that are assigned to the group. Authorizations defined for a specific user are either additional authorizations or take precedence over group authorizations.

Table 11 Group Authorizations window – General tab fields

Field	Description
Group name	Identifying name for the group.
Description	Description of the group.
Name	User IDs of users who are members of this group. This field cannot be modified. To add or delete a user, use the **Member Of** panel in the User Authorizations window.
Full Name	Full name of the user. This field cannot be modified.

LDAP Groups

The log on procedure must authenticate the identifiers of the user against external LDAP directories. Users who are not defined in the Control-M/EM Authorization Facility must belong to groups in the LDAP directory. These LDAP groups must be associated with Control-M/EM authorization groups through the Control-M/EM Authorization Facility.

To associate an LDAP group with a Control-M/EM authorization group

1 Select the **LDAP Groups** tab in the **Group Authorizations** window.

2 Define a name for the group in the field below **LDAP Groups Reference**.

3 Click **OK**.

Member Of tab actions

Table 12 User Authorizations window – Member Of tab fields

Field	Description
Not A Member of	List of groups of which the user is not a member.
Member of	List of groups of which the user is a member.

To add a user to a group

1 Select the group in the **Not A Member of** list.

2 Click **Add**. The group name is added to the **Member of** list and deleted from the **Not A Member of** list.

3 Click **OK.**

To add a user to multiple groups

1 While holding down the **Ctrl** key, select each group from the **Not A Member of** list.

2 Click **Add**. The selected group names are added to the **Member of** list and deleted from the **Not A Member of** list.

3 Click **OK.**

To remove a user from one or more groups

1 Select the group or groups from the **Member of** list.

2 Click **Remove**. The selected group names are added to the **Not A Member of** list and deleted from the **Member of** list.

3 Click **OK.**

NOTE

All of the tabs displayed and described below are included in both the User Authorizations window and the Group Authorizations window.

Authorizations window – Active tab

The **Active** tab for both Group Authorizations and User Authorizations contains the following filters:

- Displayed Jobs filter - determines what jobs in the active environment the user or group members can see when opening a ViewPoint in Control-M/EM.
- Job Actions filter - determines what actions the user or group members can perform on the displayed jobs.

For all User and Group Authorizations defined in Control-M/EM version 6.3.01, the authorizations work as follows:

Users can see jobs permitted by User Authorization filtering criteria and jobs permitted by Group Authorization criteria for any group to which the user belongs. However, the jobs actions permitted by any of those filters apply only to the jobs permitted by that filter. Therefore, the user might be able to perform certain actions on some jobs but not other jobs.

EXAMPLE

User Bob has permission to see jobs starting with a*, and is authorized to perform Free and Hold actions with regard to those jobs.

User Bob belongs to the Tech Support group. Members of this group have permission to see jobs starting with b*, and are authorized to perform Rerun and Confirm actions with regard to those jobs.

User Bob also belongs to the DBA group. Members of this group have permission to see jobs starting with c*, and are authorized to use the Log and Documentation browse features and perform Confirm actions with regard to those jobs.

When Bob logs on to Control-M/EM, he will see all jobs starting with the letter *a*, *b*, and *c*. On the group of jobs starting with the letter *a* he will be able to perform Hold and Free actions. On jobs starting with the letter *b* he can perform Rerun and Confirm actions. On jobs starting with the letter *c* he can view the Log and Documentation and perform Confirm actions.

- Users and Groups migrated from Control-M/EM version 6.2.01

  Users can see all jobs permitted by the User Authorizations, and can perform on those job any authorization permitted by either the User Authorization or the Group Authorization to which the user belongs.

EXAMPLE

User Bob has permission to see jobs starting with a*, and is authorized to perform Free and Hold actions with regard to those jobs.

User Bob also belongs to the DBA group. Members of this group are authorized to use the Log and Documentation browse features.

When user Bob logs on to Control-M/EM, he will see all jobs starting with the letter *a* and will be able to Free, Hold, and view the Log and Documentation.

- Users and Groups migrated from Control-M/EM version 6.2.01

  Users can see all jobs permitted by the User Authorizations, and can perform on those job any authorization permitted by either the User Authorization or the Group Authorization to which the user belongs.

EXAMPLE

User Bob has permission to see jobs starting with a*, and is authorized to perform Free and Hold actions with regard to those jobs.

User Bob also belongs to the DBA group. Members of this group are authorized to use the Log and Documentation browse features.

When user Bob logs on to Control-M/EM, he will see all jobs starting with the letter *a* and will be able to Free, Hold, and view the Log and Documentation.

- Users and Groups from a combination of Control-M/EM version 6.2.01 and Control-M/EM version 6.3.01

The job actions of a migrated group that does not yet have job filtering criteria defined will apply as they did in Control-M/EM version 6.2.01. However, if after migration you define a job filter for this group, the job actions allowed by this group will only apply to jobs allowed by this group.

NOTE

BMC Software recommends that you not use this option.

When displaying the **Active** tab for a new user or group, all of the **Job Actions** are unselected by default.

Table 13 Active tab fields and buttons

Field or button	Description
Jobs Filter	This check box is only displayed for groups. When selected, this check box enables the use of the Filter button to define filters for groups. **Note**: This check box is disabled for group definitions that were migrated from Control-M/EM version 6.2.01 and earlier.
Filter	Button that displays the Jobs Filter Definitions window. Jobs filter definitions that are relevant to alerts are used to automatically define the Alerts filter.
Browse actions	Active job data the user can view: Properties, Documentation, Log, Statistics, View sysout list, View JCL, view Why text.
Control actions	Control actions the user can perform: Hold, Free, Confirm, Rerun, React, Restart, Kill, Bypass.
Update actions	Update actions the user can perform: Delete, Undelete, Force OK, Edit Properties, Edit JCL.

Jobs panel buttons

Choose All buttons – In the Browse, Control, or Update pane, click the button on your left to select all check boxes.

Clear All buttons – In the Browse, Control, or Update pane, click the button on your right to clear all check boxes.

NOTE

Descriptions of each job action can be found in the *Control-M User Guide*.

To specify the types of jobs and alerts you can access

1 Click the **Filter** button in the **Displayed Jobs** pane. The Jobs Filter Definition window is displayed.

2 Enter a description for the Jobs filter.

3 Define selection criteria for the Jobs filter, as described below. Selection criteria that are relevant for alerts will also be used by the Alerts filter.

4 Click **OK** to save the Jobs filter and Alerts filter definitions.

To define selection criteria for the jobs and alerts filters

The Edit pane in the Jobs Filter Definition window contains field-operator-value combinations that define the Jobs filter. The field values are compared with the parameter values in job processing definitions to determine if the jobs are included or excluded by the Jobs filter. Job parameters are described in the *Control-M Parameter Guide*.

Table 14 Collection selection criteria

Column	Description
Field	Field to be checked in the job processing definition.
Operator	Relational operator to be applied to the specified value.
Value	Value that determines whether a criteria is satisfied.

The **Field** column is a list box. If a row can be changed, an arrow is displayed to the right of the **Field** column on that row. Click this arrow to display the field names that can be used in the Jobs filter.

The **Operator** column is under the **Value** heading. If you click a cell in the **Operator** column, a list box is displayed. Valid operators are listed in Table 15.

Table 15 Valid operators

Operator	Description
=	Value in the job must equal the value in the table.
LIKE	Use of wild card * in the value field.
>	Value in the job must be greater than the value in the table.
<	Value in the job must be less than the value in the table.
!=	Value in the job must not equal the value in the table.

The **Value** column is used to specify the value of the field. You can manually enter a value or, for some fields, you can select a value from a list that is displayed when you click a cell inside the column.

NOTE

Use the arrow keys or the vertical scroll bar to move through values in a list box. Use the **Tab** key to skip to the next column in the table. Each completed row in the table is added to the appropriate **Include in** or **Exclude from Jobs Filter** list described below.

Applying the criteria

The middle section of the Jobs Filter Definition window contains **Include in Jobs Filter** and **Exclude from Jobs Filter** lists that are used to specify how the selection criteria are applied.

Each line in the **Include in** or **Exclude from Jobs Filter** list can include multiple criteria. There is an AND relationship between all the criteria on a line. Only jobs that satisfy all the criteria on a line are included or excluded by the Jobs filter.

There is an OR relationship between separate lines in the **Include in** or **Exclude from Jobs Filter** list. Jobs that fulfill the criteria on any one line are included or excluded by the Jobs filter.

The first example below (with single criteria) and second example (with multiple criteria) illustrate how to define a Jobs filter.

EXAMPLE

The Jobs filter definition includes jobs that meet both of the following inclusion criteria:

- The job Member name must end with **e**.
- The job must run on a Control-M installation whose name begins with **o**.

or that meet the following inclusion criteria:

- The job is cyclic.

Even if a job meets the preceding inclusion criteria, the filter excludes the job if it runs on a Control-M installation whose name is **omega-ctm3**.

To add a line in the Include in or Exclude from Jobs Filter list

1 Click **Add**.

2 Create criteria for this line as described above.

3 Click anywhere outside the last editable field in the table row, or press the **Tab** key, until a new Edit line is displayed.

To add or modify criteria in the Include in or Exclude from Jobs Filter list

1 Select a line from the **Include in/Exclude from Jobs Filter** list.
The criteria are displayed in the **Edit** pane.

2 Add to or modify the criteria.

To delete criteria from a line in the Include In or Exclude From Jobs Filter list

1 Select the line to be changed. The criteria are displayed in the **Edit** pane.

2 Select the criterion you want to delete by clicking its number in the **Edit** pane.

3 Press the **Delete** key.

4 Press the **Tab** key twice.

To delete a line in the Include in or Exclude from Jobs Filter list

1 Select the line to delete.

2 Click **Delete**.

Authorizations window - Owner tab

The Owner tab is an additional filter to the table that enables you to grant the user authorization to create and update job definitions for specific jobs in Control-M/Desktop and using the XML utilities.

NOTE

The definitions in the **Owner** tab only apply to users who have at least the Update access level in the **Tables** tab.

NOTE

The definitions in the **Owner** tab do not apply to SMART Tables, rather to the jobs in the SMART Table.

Table 16 Owners tab fields

Field	Description
Control-M	The Control-M server on which the job the user is allowed to modify resides.
Owner	Owner (user ID) on whose behalf the job is executed.
Node ID/Group	The computers on which the user has authority to change jobs. Node ID or group on which you want the job to run. **Notes**: ■ The <*local*> **Node ID/Group** value should be used when the **Node ID/Group** field in the job editing form is left empty. ■ The Node ID / Group field is not applied to jobs running on Control-M for z / OS.

For more information, see Chapter 4, "Defining how jobs should run."

Authorizations window – Privileges tab

This panel specifies access levels that determine the actions that a user or member of a group can or cannot perform on different parts of Control-M / EM.

Actions that are permitted or denied for each access level are described in Table 17.

Table 17 Privileges tab access levels

Access Level	Description
None	Denies access to the component.
Browse	Can view and refresh the component.
Update	Permits adding and modifying Control-M information.
Full	Permits adding, modifying, and deleting Control-M information.
Default	[Valid for user authorizations. Not valid for group authorizations.] Inherits the permissions from the group to which the user belongs.

TIP

To change the access level for one of the row items, click the row in the Access Level column and select the access level from the drop-down menu.

Control-M/EM components and privileges

This section describes the effects of the definitions applied to the various rows of the Privileges tab.

Table 18 Privileges and features (Part 1 of 2)

Control-M/EM privilege	Feature	Description
Control-M Configuration Manager	Logon	The ability to log on to the CCM.
	Configuration	The ability to ■ create, update, delete, and get Control-M / EM components ■ enable, disable, update, and manage Control-M / Server requests ■ create, update, delete, and get Control-M / EM system parameters ■ view agent logs and get components ■ use CTL on a Control-M / EM component ■ perform administrative tasks for Control-M / Agents ■ get and set Control-M debug level
	Operation	The ability to manage components, including: ■ Start and stop Control-M / EM components. ■ Recycle Control-M / EM components. ■ Set ignore request levels.
	Database	The ability to ■ remove old requests ■ check the amount of space in the database ■ enlarge the database
	Control-M / Server Security	The ability to create, update, view, and delete user and group Control-M security records.
Control-M / EM Security	Authorizations	The ability to access the Authorizations window in Control-M / EM GUI and Control-M / EM Desktop.

Table 18 Privileges and features (Part 2 of 2)

Control-M/EM privilege	Feature	Description
Monitoring and Administration tools	Archived viewpoints	Actions that can be performed on archived viewpoints.
	CLI	The ability to use the CLI utility. For more information, see the *Control-M Utility Guide*.
	Alerts	Specifies whether Alerts can be monitored and the actions that can be performed on them. **Note**: Relevant parameters of the Jobs filter are also used to filter the Alert messages that are displayed.
	BIM	The ability to access BMC Batch Impact Manager and its features.
ViewPoint Manager	Collections	The ability to perform actions on Collection definitions.
	Hierarchies	The ability to perform actions on Hierarchy definitions.
	Filters	The ability to perform actions on Filter definitions.
	Viewpoints	The ability to perform actions on ViewPoint definitions.

AND/OR logic for tables, conditions, resources, and calendars

In the Tables, Prerequisite Conditions, Control Resources, Quantitative Resources, Global Conditions, and Calendars panels:

- The relationship between multiple values on a line is **AND**.
- The relationship between multiple lines is **OR**.

Authorizations window – Tables tab

This tab authorizes Tables and a level of access for a user or group.

Table 19 Table tab fields

Field	Definition
Control-M	Control-M installations whose tables can be accessed.
Library	[Control-M for z/OS] Libraries from which tables can be accessed.
Table	Tables that can be accessed.
Access Level	Level of access as described in Table access levels.

To add a row to the Tables tab

1 Click **Add** to display the Tables dialog box.

NOTE

In previous versions of Control-M/EM, authorization was not granted if a **Table, Library,** or **Control-M** field was blank. Values in these fields were treated as prefixes. In this version, these values are regular expressions that can be used for pattern-matching.

A Specify names or name patterns of Control-M installations in the **Control-M** text box. Use ***** to denote all Control-M installations. For information about pattern-matching strings, see Appendix C, "Formats, values and functions."

B [Control-M for z/OS only] Specify names or name patterns for libraries of Tables in the **Library** text box. Use ***** to denote all libraries.

C Specify names or name patterns for tables in the **Table** text box. Use ***** to denote all tables.

D Select the **Access Level** for these tables from the list box:

Table 20 Table access levels

Access Level	Permitted actions
Browse	Viewing tables in Control-M/Desktop. Default: Cannot order or force jobs. Can be modified to allow ordering and forcing jobs.
Update	Modifying and adding tables. Ordering and forcing jobs.
Full	Modifying, adding, and deleting tables. Ordering and forcing jobs.

E Click **OK** to add the tables to the list in the **Tables** panel.

2 Repeat step 1 for other access levels (if any) and other tables.

3 Click **OK** to save the result of the **Add** procedure.

To update a row in the Tables panel of an Authorizations window

1 Select a row. Click **Update** to display that row in a **Tables** dialog box.

2 Make the changes to the data in the text boxes of that dialog box.

3 Click **OK** to save the result of the update.

To delete a row in Tables panel of an Authorizations window

1 Select a row and click **Delete** to delete that row from the list.

2 Click **OK** to save the result of the deletion.

AND/OR logic for User and Group Authorizations window panels

See "AND / OR logic for tables, conditions, resources, and calendars" on page 61.

Authorizations window – Prerequisite Conditions tab

The **Prerequisite Conditions** tab specifies the prerequisite conditions a user can access. For information about prerequisite conditions, see "Defining dependencies for the current job" on page 108.

Table 21 Prerequisite Conditions panel fields

Field	Description
Control-M	Control-M installations whose prerequisite conditions can be accessed
Condition	Prerequisite conditions that can be accessed.
Access Level	Browse, Update, and Full access levels, as described in Table 22.

To add a row to a User/Group Authorizations – Prerequisite Conditions panel

1 Click **Add** to display the New Prerequisite Condition dialog box.

A Specify names or name patterns of Control-M installations in the **Control-M** text box. Use ***** to denote all Control-M installations. See the information about specifying pattern-matching strings in Appendix C, "Formats, values and functions."

B Specify names or name patterns for prerequisite conditions in the **Condition** text box. Use ***** to denote all prerequisite conditions.

C Select the **Access Level** for these prerequisite conditions from the list box:

Table 22 Prerequisite Conditions access levels

Access Level	Permitted Actions
Browse	Viewing the prerequisite conditions only.
Update	Modifying the prerequisite conditions and adding new ones.
Full	Modifying and deleting prerequisite conditions and adding new ones.

D Click **OK** to add the defined prerequisite conditions to the list in the **Prerequisite Conditions** panel of the User (or Group) Authorizations window.

NOTE

Use ***** to denote all Control-M installations or prerequisite conditions.

E Repeat step 1 for other access levels (if any) and other prerequisite conditions.

2 Click **OK** to save the result of the Add procedure.

To update a row in a User/Group Authorizations – Prerequisite Conditions panel

1 Select a row. Click **Update** to display that row in a Prerequisite Conditions dialog box.

2 Make the changes to the data in the text boxes of that dialog box.

3 Click **OK** to save the result of the update.

4 Click **OK** to save the result of the update.

To delete a row in an Authorizations window Prerequisite Conditions panel

1 Select a row and click **Delete** to delete that row from the list.

2 Click **OK** to save the result of the deletion.

NOTE

The steps for setting authorization levels for control resources, quantitative resources, and calendars are similar to the preceding steps for setting authorization levels for prerequisite conditions.

Example

To authorize a user to modify prerequisite conditions that start with the letter **C** or **D**:

1 Click **Add** in the **Prerequisite Conditions** panel.

2 In the New Prerequisite Condition dialog box, specify CTM1 in the **Control-M** text box, type **C*** in the **Conditions** text box, and choose **Update** in the **Access Level** list box. Click **OK**.

3 Click **Add** again in the **Prerequisite Conditions** panel.

4 In the New Prerequisite Condition dialog box, specify CTM2 in the **Control-M** text box, type **D*** in the **Conditions** text box, and choose **Update** in the **Access Level** list box. Click **OK**.

5 Click **OK** in the User Authorizations window.

Authorizations window – Control Resources tab

The **Control Resources** tab specifies the control resources a user can access. For information about control resources, see Chapter 15, "Identifying data center resources available for Control-M use."

Table 23 Control Resources tab fields

Field	Description
Control-M	Control-M installations whose resources can be accessed.
Resource	Control resources the user can access.
Access Level	Access level for control resources as described in Table 24.

To set authorization levels for control resources

Follow the steps described under "To add a row to a User/Group Authorizations – Prerequisite Conditions panel" on page 63. Steps relating to the **Condition** text box or field should be applied to the (control) **Resource** text box or field.

Table 24 Control Resources access levels

Access Level	Permitted Actions
Browse	Viewing the specified control resources only.
Update	Modifying the specified control resources and adding new ones.
Full	Modifying and deleting the specified resources and adding new ones.

Authorizations window – Quantitative Resources tab

The **Quantitative Resources** panel specifies the quantitative resources a user can access. For information about quantitative resources, see Chapter 15, "Identifying data center resources available for Control-M use."

Table 25 Quantitative Resources panel fields

Field	Description
Control-M	Control-M installations whose resources can be accessed.
Resource	Quantitative resources the user can access.
Access Level	Authorization level for the resources as described in Table 26.

To set authorization levels for quantitative resources

Follow the steps described under "To add a row to a User/Group Authorizations – Prerequisite Conditions panel" on page 63. Steps relating to the **Condition** text box or field should be applied to the (quantitative) **Resource** text box or field.

Table 26 Quantitative Resources access levels

Access Level	Permitted Actions
Browse	Viewing the specified quantitative resources only.
Update	Modifying the specified quantitative resources and adding new ones.
Full	Modifying and deleting the specified resources and adding new ones.

User Authorizations window – Global Conditions tab

The **Global Conditions** tab specifies the global conditions a user can access. For information about global conditions, see Chapter 16, "Establishing job dependencies across Control-Ms."

Table 27 Global Conditions tab fields

Field	Description
Prefix	Prefix for global conditions the user can access.
Access Level	Authorization level for global conditions.

To set authorization levels for global conditions

Follow the steps described under "To add a row to a User/Group Authorizations – Prerequisite Conditions panel" on page 63. Steps relating to the **Control-M** text box and field are omitted because global conditions are relevant to all Control-M installations. Steps relating to the **Condition** text box or field should be applied to the (global conditions) **Prefix** text box or field.

Table 28 Global Conditions access levels

Access level	Permitted actions
Browse	Viewing the global conditions only.
Update	Modifying the global conditions and adding new ones.
Full	Modifying and deleting global conditions and adding new ones.

Authorizations window – Calendars tab

Table 29 Calendars fields

Field	Description
Control-M	Control-M installations whose calendars can be accessed.
Calendar	Calendars the user can access.
Access Level	Access level described in Table 30.

For information about Calendars, see Chapter 8, "Using predefined calendars to schedule jobs."

To set authorizations for calendars

Follow the steps described under "To add a row to a User/Group Authorizations – Prerequisite Conditions panel" on page 63. Steps relating to the **Condition** text box or field should be applied to the **Calendar** text box or field.

Table 30 Access levels

Access Level	Description
Browse	Permits viewing specified Calendars in Control-M/Desktop only.
Update	Permits modifying specified Calendars in Control-M/Desktop and adding new ones.
Full	Permits modifying and deleting specified Calendars in Control-M/Desktop and adding new ones.

Authorizations window - Services tab

The services tab in the Authorizations window enables you to determine service permissions for each user.

To add a service permission:

1 Double-click a user.

The **User Authorizations: <*user*>** window appears.

2 Click the **Services** tab and then click .

The **User Authorizations: Services** dialog box appears.

3 In the **Service** field, type the names or name patterns for services.

You can use * to denote all services.

4 In the **Active** area, select all the permissions that apply to this user, as described in Table 31.

Table 31 Services permissions

Permission	Description
Drill Down to view jobs	Enables the user to view jobs in Control-M Self Service and Control-M/EM GUI. To enable this permission, you need to select at least a Browse access level from the **Active** tab, as described in "Authorizations window – Active tab" on page 53.
Run orderable services	Enables the user to order a service in Control-M Self Service. To enable this permission, you need to associate this user to the owner of the service in the Owner tab, as described in "Authorizations window - Owner tab" on page 58.
Hold	Enables the user to hold a service, which stops the service from running. To enable this permission and other job actions, you need to select the required permissions for this user from the Active tab, as described in "Authorizations window – Active tab" on page 53.
Release	Enables the user to release a service, which frees it from being held and is available to run again. To enable this permission and other job actions, you need to select the required permissions for this user from the Active tab, as described in "Authorizations window – Active tab" on page 53.
View orderable services that were started by other users	Enables the user to view services that were ordered by other users

NOTE

When you add a service user authorization, the user automatically receives permission to view non-orderable services and orderable services that the user ordered.

5 In the **Definition** area, select one of the following access levels for each service in the **Service Definition Manager**:

- **None:** Disables the user from viewing, adding, editing, and deleting services in the Self Service Definition Manager
- **Browse**: Enables the user to view services in the Self Service Definition Manager

- **Update**: Enables the user to add and edit services in the Self Service Definition Manager
- **Full**: Enables the user to add, edit, and delete services in the Self Service Definition Manager

6 Click **OK**.

The new service permission appears in the **Authorizations** window.

7 Click **OK**.

To edit a service permission:

1 Double-click a user.

The **User Authorizations: < *user*>** window appears.

2 Click the **Services** tab.

3 Select the service permission that you want to edit and click .

4 Edit the required fields, as described in Table 31.

5 Click **OK**.

The updated service permission appears in the **User Authorizations: <*user*>.**

6 Click **OK**.

To delete a service permission:

1 Double-click a user.

The **User Authorizations: < *user*>** window appears.

2 Click the **Services** tab.

3 Select the service permission that you want to delete and click .

The service permission is deleted.

Part 2

Defining the production environment

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Chapter 3

Defining the production environment

Your largest and most fundamental task when you define the production environment is defining appropriate job processing definitions, which Control-M uses to control job processing and handling. This book describes how to define job processing definitions by using Control-M/Desktop (you can also define job processing definitions by using batch job creation utilities).

To define job processing definitions, you should be familiar with the concept of workspaces.

Understanding workspaces

When you define job processing definitions in Control-M/Desktop, you can work in one of the following workspaces:

- Local workspace —enables you to work locally. You can load jobs from the Control-M/EM database into your local workspace, in which case you are granted exclusive access over the jobs. When you save your work, the definitions are saved in XML file format or an internal draft file that you can later reopen in the local workspace. XML format is the default file type.

  For changes to be used in production, they must be written to the Control-M/EM database and uploaded to the Control-M database.

- Online workspace — enables you to work on the Control-M/EM database. When you load jobs from Control-M/EM into an online workspace, you are granted shared access over the jobs. When you perform a save, the work is saved directly in the Control-M/EM database. To be used in production, changes must be uploaded to the Control-M database.

NOTE

- In Control-M/Desktop, you can also use an interface called the Table Manager to directly access and modify jobs in the Control-M/EM database. In this case, you are not working in a workspace.
- If the Forecast add-on is installed, you can work in a special purpose workspace called the Forecast workspace.

Regardless of which workspace you are working in when you start Control-M/Desktop, you can change workspaces (or activate the Table Manager) at any time.

Where to go from here

NOTE

These guidelines assume that you are already familiar with the information in Part 1 of this book. If you are not, review the instructions for starting and navigating in Control-M/Desktop in Chapter 2 before continuing with this part of the book.

Review the following list, and proceed to the appropriate .

- To define or update jobs, and place them into the appropriate databases, proceed to Chapter 4, “Defining how jobs should run.”

  Chapter 4, “Defining how jobs should run” is the most important chapter in this part of the book. It provides the instructions and examples for defining job processing definitions online in the job editing form and for defining SMART Tables online in the table editing form. Regardless of whether you are defining jobs online or in batch, or defining individual jobs or large numbers of jobs at once, this chapter is very useful.

  — Decide whether the job or jobs belong to a service (BMC Batch Impact Manager) and make the necessary definitions. (See Chapter 25, “Service monitoring.”)

  — When you define schedules in job processing definitions, you can reference a calendar to simplify scheduling definition. For information on defining calendars, refer to Chapter 8, “Using predefined calendars to schedule jobs.”

  — When you create a job processing definition, you can assign to it an existing template containing predefined values. To define a new template, see Chapter 9, “Setting up templates for standardized job and table definition.”

  — You do not need to create and update job processing definitions individually. For instructions on how to automatically create or update large numbers of job processing definitions, refer to Chapter 10, “Creating and updating many jobs at once.”

- To manage your jobs and tables (copy, delete, and so on), refer to Chapter 5, "Organizing and managing jobs in tables."

When you have finished defining job processing definitions, remember that you still must do the following steps to automate the production environment:

- To define security requirements as needed, see the *Control-M Administrator Guide*.
- To move to production (move jobs to production, automate job scheduling, and define resources and global conditions to the data center), see Part 3, "Moving to production."
- To check that the jobs work as intended, see Part 4, "Monitoring and intervening in production."
- To analyze and optimize production, see Part 5, "Analyzing and optimizing the production environment."

Chapter 4

Defining how jobs should run

This chapter presents the following topics:

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Creating and editing jobs 83
Assigning a name to the job 84
Assigning a name to the job 84
Assigning a name to the job 84
Identifying the task type and related information 84
Defining the job hierarchy 87
Defining the job's owner and author 87
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Defining and using variables that are dynamically resolved at runtime 112
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Defining dependencies, variables, and notifications in the SMART Table 132
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Modifying dependencies for jobs within a SMART table..... 139
Defining job dependencies by using the flow diagram 140
Defining a condition format..... 141

This chapter provides tips, and examples, on how to define individual job processing definitions.

A SMART Table is different than a job processing definition in that a SMART Table is really an extended set of table definition parameters that defines how to process its jobs as a unified group.

Nevertheless, the procedure for defining job processing definitions and the procedure for defining SMART tables are quite similar, and they are described together.

Defining job processing definitions and SMART Tables—basic procedure

In Control-M / Desktop, you create and modify

- jobs processing definitions using the job editing form
- SMART Tables using the table editing form

To define a job or SMART Table

1 In Control-M / Desktop, do one of the following actions:

- To modify an existing job or table, double-click the job or table in the flow diagram, navigation tree or list display.

TIP

An easy way to find a job is to choose **Edit => Find Jobs.**

- To create a new job processing definition, choose **Edit => New Job**.
- To create a new table, choose **Edit => New Table**.

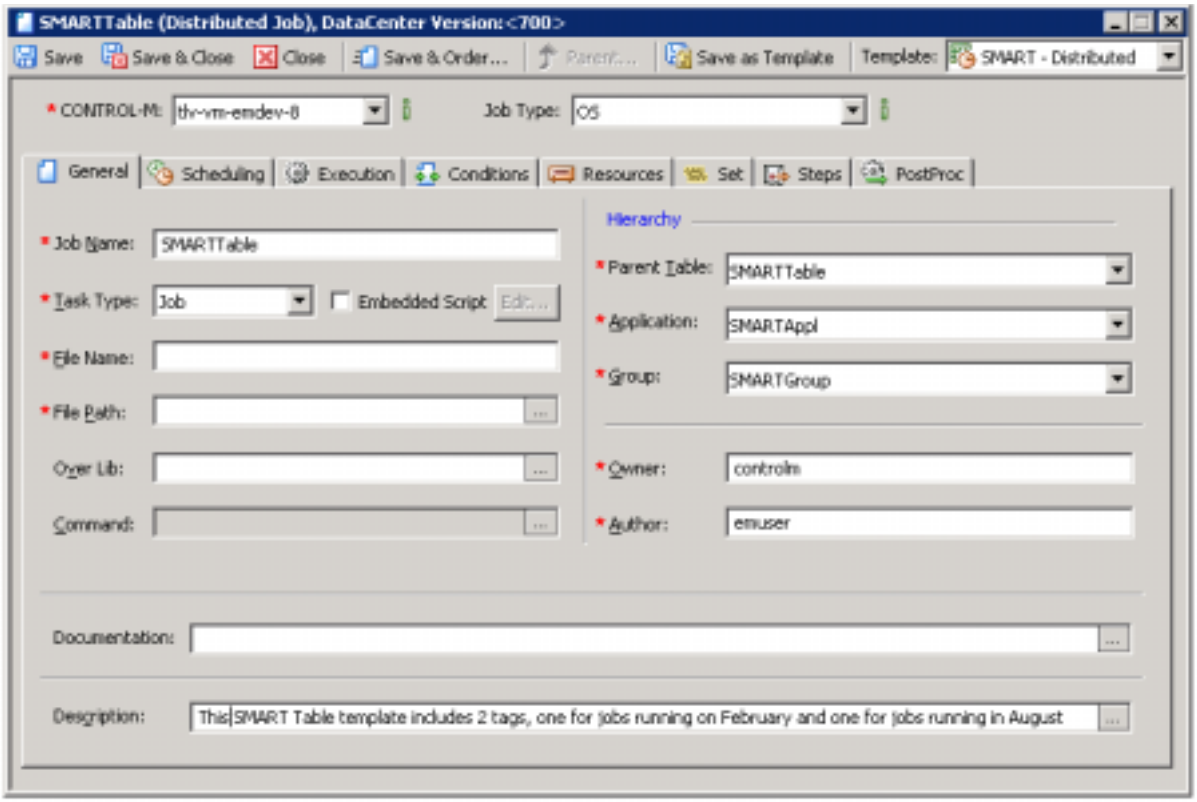
NOTE

You must be working in a local workspace to create a SMART table, and you must create the SMART table before you create any job processing definitions in the SMART Table.

Newly created jobs can be associated with an existing SMART Tables and the SMART Table will be loaded from the database. If the job is associated with a Sub-table, then all of the Sub-table's parent table entities, without their content, will also be loaded to the draft or XML file.

The job editing form (or table editing form) opens.

Figure 4 Job editing form



2 If you are creating a new job (or SMART table), do the following steps:

A In the **Apply Template** field in the toolbar, select the template to be applied. (Optional. You can select the value **<No Template>**.)

The product is supplied with a default job and default SMART Table template for each platform. Only job templates are listed in the job editing form and only SMART table templates are listed in the table editing form. Icons indicate whether templates are job templates or SMART Table templates. You can modify the templates or define others. For details, see Chapter 9, "Setting up templates for standardized job and table definition."

TIP

You can use a SMART Table template not only for defining SMART Tables, but also for defining jobs in a SMART Table.

NOTE

Which template types are displayed in the template list can be customized. For details, see the customization option "List all templates" on page 352 in Appendix A, "Customizing the interfaces."

B In the **Control-M** field, select the Control-M that will control the job.

C If you are creating a table:

- Select whether the table will be a SMART Table with an extended set of table definition parameters by clicking the **SMART** check-box at the top of the window. For more information about SMART Tables see "Creating and editing SMART Tables" on page 127.

If you are creating a job:

- in the **Job type** field, select the type of job.

NOTE

Starting with Control-M/EM 6.3.01, **Job Type** replaces the following parameters: **Application Node Group** (but not **Node Group** or **Node ID/Group**), **Form Name**, **Application type**, **Application version** and **CM version**.

The default value is **OS**. Select this value except in the following situations:

- For mission critical jobs, if the BMC Batch Impact Manager product is installed, select **BIM**.
- For external application jobs, such as SAP or Oracle E-Business Suite, select the appropriate job type, but first ensure that the relevant Control Module is installed, and the appropriate application form has been imported.

  To import Application forms, choose **Tools => Import Application Form** and browse to and select the form. For details, see the relevant Control Module administrator guide.

3 Edit the definition (as appropriate), as described in "Creating and editing jobs" on page 83.

NOTE

If you selected a **Job Type** value other than **OS**, a tab related to the particular job type is automatically added as the second tab in the job editing form. For instructions on filling in this additional tab, see the following:

- For a BIM tab, see the *Control-M Business Service Management Solution User Guide*.
- For an external application tab, see the appropriate Control Module administrator guide.

TIP

To be able to use this job definition as a basis for creating other jobs, click **Save as Template** before proceeding.

4 Save the definition by clicking **Save**, **Save & Close** or **Save & Order** at the top of the editing form. If the Audit Annotation function was activated, the **Audit Annotation** window or an action confirmation prompt appears.

When saving the definition, consider the following:

- If you save the job while working in an Online workspace or working through the Table manager, the new or modified job processing definition is saved directly in the Control-M/EM database. To use the job in production, you must perform an upload to the Control-M/Server database.
- If you save the job while working in a Local workspace, the new or modified job processing definition is saved in an XML file format or as an internal draft file. To use the job in production, you must write the job (actually, its table) to the Control-M/EM database and upload the table to the Control-M/Server database.
- If you order or force the job, a dialog box is displayed that enables you to upload (and write) the job as part of the order/force request. Fill in the dialog box as described in "Manually scheduling jobs and tables" on page 198.

5 If an action confirmation prompt is displayed:

- click **OK** to complete the action or **Cancel** to cancel the changes.

If the **Audit Annotation** window appears:

- enter a purpose for performing this action in the **Subject** field and a justification or descriptive note in the **Description** field. Click **OK**.

NOTE

The system administrator can configure which actions require annotation. Therefore, the **Audit Annotation** window does not necessarily appear after creating/editing jobs or tables. See "Annotating activities" on page 126 for details about auditing and annotation.

For details about writing and loading tables and jobs, see Chapter 13, "Putting jobs into production."

This product comes with a draft containing sample job processing definitions. For an explanation of how and why these job processing definitions were defined the way they were, see Appendix B, "Examples for defining jobs."

Creating and editing jobs

This section describes the following topics:

Assigning a name to the job
Identifying the task type and related information
Defining the job hierarchy
Defining the job's owner and author
Defining job documentation
Defining scheduling criteria for a job—basics
Defining scheduling criteria using calendars
Defining complex scheduling criteria using rules
Limiting scheduling to a particular date range
Defining cyclic jobs
Defining automatic rerun for a job that ends NOT OK
Defining jobs that should run on specific nodes
Defining jobs that should run on nodes where load balancing has been implemented
Defining a time frame during which jobs can be submitted
Defining that manual confirmation is required before job submission
Assigning priorities to jobs and defining and critical jobs
Defining how many days a job can await submission
Defining dependencies for the current job
Allocating resources for a job
Defining and using variables that are dynamically resolved at runtime
Defining postprocessing actions that depend on job processing results
Defining conditional processing under z/OS
Defining messages to be shouted at the end of job processing
Defining how to handle the job's sysout when the job ends OK
Archiving sysdata (z/OS only)
Annotating activities

The job editing form and table editing form consist of a series of tabs, each providing a set of parameters for defining job and table processing definitions.

NOTE

- A red asterisk indicates required fields.
- The fields displayed in the job editing form might vary according to the type of job (z/OS, group, and so on).
- To sequentially undo entries, click **Ctrl+z**. To sequentially redo undone entries, click **Ctrl+y**. This feature works even when the page with the entry is not currently displayed.
- Most fields are self-explanatory and not explained here. For a detailed description of the job editing form fields, see the *Control-M Parameter Guide*.

Assigning a name to the job

In the General tab, in the **Job Name** field, you must assign a name to each job processing definition. This name (along with the file name parameter) appears in various job definition and job tracking displays, enabling you to identify the job. You also use this name when ordering or forcing jobs.

NOTE

When creating a table, the **Table** field in the General Tab of the table editing form defines the name of the table the same as the **Job Name** field defines the name of the job in the job editing form. The following should be considered:

- Table names cannot contain the character " / " in its name.
- Names for tables and Sub-tables may be up to 64 characters, with the exception of Control-M for z / OS tables which may be up to 8 characters.

Identifying the task type and related information

You must identify the type of task this job processing definition performs. Different task types require different accompanying information, so depending on the task type select, certain fields displayed in the tab might change to accommodate the information required. (Task types and their accompanying fields might also vary somewhat according to platform.) This section describes how to fill in task type and related information for UNIX and Windows platforms. For more details, or for information relating to other platforms, see the *Control-M Parameter Guide*.

To identify the type of task the job performs, and related information

1 In the General tab, select the task type appropriate to the job, in the **Task Type** field:

- If the job processing definition provides Control-M with information for submitting a job for execution as a background process, and instructions for performing postprocessing following job execution, select **Job**. This applies to most production batch jobs submitted under Control-M.

- If the job processing definition provides Control-M with instructions for running an executable (**.exe**) file, select **Detached**.

- If the job processing definition provides Control-M with an operating system command to be executed as a job (that is, so that Control-M will track and analyze the results and perform postprocessing), select **Command**. You can also use Command-type jobs to run certain Control-M / Server utilities.

- If the job processing definition instructs Control-M to analyze the results of jobs not submitted under Control-M (for example the job is submitted under an external application such as SAP), select **External**.

- If the job processing definitions is not responsible for execution of a job or operating system command, but merely instructs Control-M to perform postprocessing actions such Shout or adding Out conditions, select Dummy. This task type is useful if you want these postprocessing instructions to be performed as a result of the outcome of other jobs, or as a result of a change of status in the system.

2 Fill in the accompanying fields that are specific to the task type:

- If the task type is **Job** or **Detached**, do one of the following:

  - specify a job script or executable file by doing the following:

  — in the **File Name** field, specify the job script or executable file
  — in the **Path** field, specify the full path to the job script or executable file

  - embed a job script by doing the following:

  — select **Embedded Script**, click **Edit**, and type in a script or load it from a file
  — in the **File Name** field, specify the job script's logical name

- If the task type is **Command**

  — in the **Command** field, specify the operating system command

- For task type **Dummy**, no accompanying fields in this section are required.

TIP

By default, the **File Name** value is displayed in the flow diagram job node. For **Command** and **Dummy** jobs, to display the job name in the job node, copy the job name to the **File Name** field. (Alternatively, you can change the job node display defaults.)

EXAMPLE

The **CalcExpenses.bat** batch job, which calculates the expenses incurred by the company on the current day, should be scheduled, submitted, and monitored by Control-M, which should also perform any required postprocessing.

Fill in the task type and related information, as follows:

1. In the **Job Name** field, specify **CalcExpenses**.
2. In the **Task Type** field, select **Job**.
3. In the **File Name** field, specify **CalcExpenses.bat**.
4. In the **Path** field, specify **C:\Prod\Acct\Calc**.

EXAMPLE

Control-M should be responsible for the scheduling, submission, and postprocessing for the **SystemStatus.exe** executable job, which determines those external applications that are up and those that are down.

Fill in the task type and related information, as follows:

1. In the **Job Name** field, specify **SystemStatus**.
2. In the **Task Type** field, select **Detached**.
3. In the **File Name** field, specify **SystemStatus.exe**.
4. In the **Path** field, specify **C:\System\Maint**.

EXAMPLE

Control-M should use an operating system command to backup daily transactions; it should also monitor the results and perform post-processing if needed:

Fill in the task type and related information for the **BkpDailyTrans** job, as follows:

1. In the **Job Name** field, specify **BkpDailyTrans**.
2. In the **Task Type** field, select **Command**.
3. In the **Command** field, specify **Copy D:\Data\Transactions\Daily%%ODATE.txt E:**.
4. (Optionally, in the **File Name** field, specify **BkpDailyTrans** so the name appears in the flow diagram job node.)

EXAMPLE

In the event of an emergency that requires evacuation of the site, the site manager submits the **Evacuation Alert** emergency job, which shouts a message to all personnel to shut down their machines and leave the building.

Fill in the task type and related information, as follows:

1. In the **Job Name** field, specify **EvacuationAlert**.
2. In the **Task Type** field, select **Dummy**.
3. (Optionally, in the **File Name** field, specify **EvacuationAlert** so the name appears in the flow diagram job node.)

Defining the job hierarchy

In the General tab, select the following hierarchy information for each job processing definition: table, application and group. (For information regarding this hierarchy information, see the *Control-M Concepts Guide*.)

NOTE

If the table, application or group does not yet exist, type the information in and Control-M / Desktop will automatically create the items.

Defining the job's owner and author

For security and authorization reasons, you must specify in the General tab an owner and author for each job processing definition:

- The author is the person who defines the job.
- The owner is the User ID associated with the job—that is, for whom the job is executed.

Defining job documentation

BMC Software recommends that you provide a brief description of the job definition in the **Description** field in the **General** tab. This information will appear in displays, such as job nodes, enabling you to know at a glance what the job does.

In the **Documentation** field, you can create a documentation file in order to provide details about the job. For example, you might want to document the purpose of the job, under what conditions it should run, necessary prerequisites, whom to notify if there are problems, and so on. The file path can be up to 255 characters and the file name up to 64 characters.

The documentation file path can also be a URL, using one of the following prefixes: http://, https://, and ftp://. By clicking **View** to the right of the **Documentation** field, you can view the documentation specified.

Defining scheduling criteria for a job—basics

TIP

If Control-M/Forecast is installed, you can graphically display when and how often jobs will be scheduled by clicking **Forecast**.

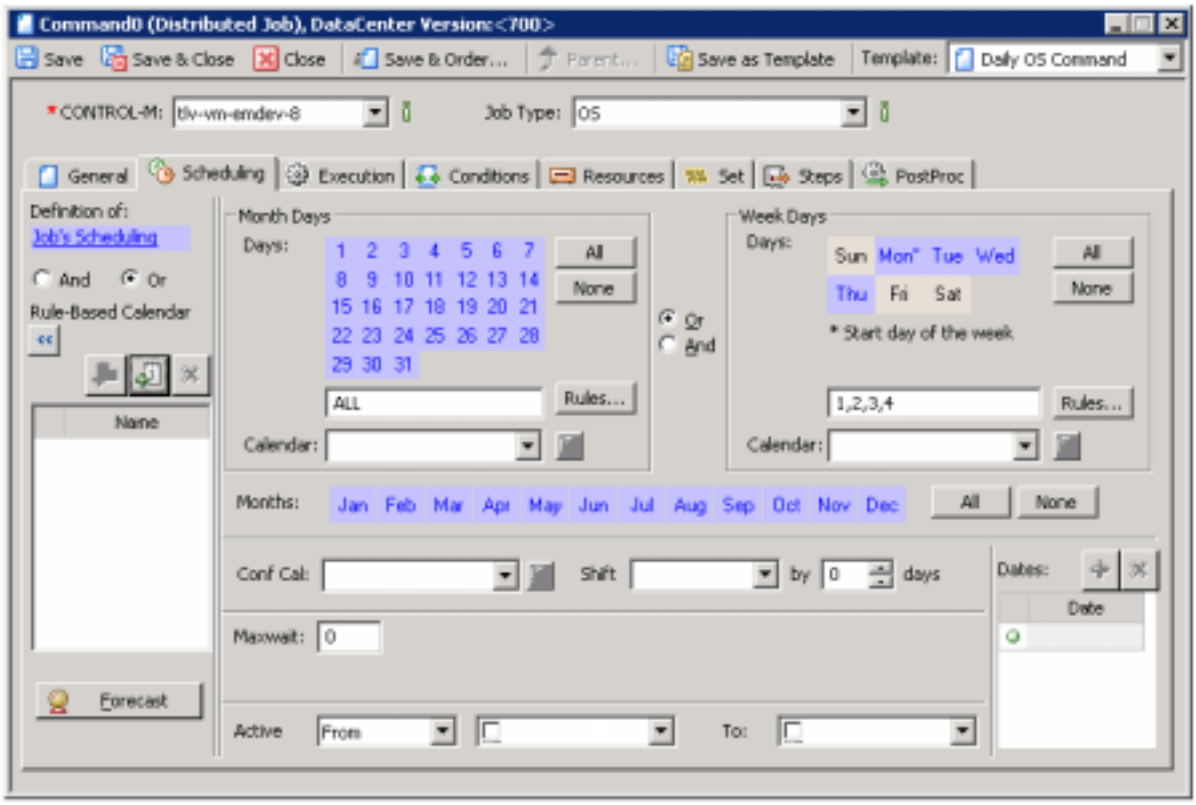
Define the schedule for job or SMART Table in the Scheduling tab.

Starting with Control-M/EM 7.0.00 Fix Pack 1 the editing form for jobs, tables, and templates has a unified interface. Through the Scheduling tab for each of these entities, you can apply Rule-Based Calendars (RBC). (For more information about RBCs, see Chapter 8, “Using predefined calendars to schedule jobs.”).

The job scheduling definition is a combination of the job scheduling parameters and the RBCs (see Figure 5 on page 89). The Scheduling tab in job templates is identical to the Scheduling tab for jobs.

The SMART table definition includes the RBCs that can be applied to all the jobs and sub-tables included in the SMART table (see Figure 6 on page 130). The Scheduling tab in SMART table templates is identical to the Scheduling tab for SMART tables.

Figure 5 Scheduling tab in the job editing form



The following table describes the parameters in the Scheduling tab.

Table 32 Scheduling tab parameters (Part 1 of 4)

Parameter	Description	
Definition of Job's Scheduling	■ Set the criteria for the job scheduling using the parameters, calendar, and text box in the tab. ■ Set the relationship between the job scheduling criteria and the selected Control-M level RBCs by choosing either **And** or **Or**. This relationship setting is only applicable for jobs; it is not applicable for SMART tables. **Note:** Control-M level Ruled-Based Calendars can only be used with Control-M Servers version 7.0.00 or later.	
Ruled-Based Calendars Name (*dynamically displayed depending if RBCs are supported*)	List of names of the selected Control-M level Ruled-Based Calendars that applied to this job. Add a calendar to the list using the Select Rule-Based Calendar button, which opens the **Select Rule-Based Calendar** window, where the following options are available: ■ All Parent - Inherits all the RBCs from the direct parent table. (If an RBC is added to the parent table, it is automatically associated with the job.) Default. ■ Specific - Only the RBCs selected from the list are associated with the job. **Note:** In a SMART Sub-table the **Select Rule-Based Calendar** window only lists RBCs which are defined in the Sub-table's parent table. Use the Remove button to remove calendars from the list. **Note:** Control-M level Ruled-Based Calendars can only be used with Control-M Servers version 7.0.00 or later.	
Month Days	A calendar and text box used to indicate the days of each month on which the job should be scheduled.	
	Month Days check-boxes	Each day of the month is (1—31) is indicated by a check-box.
	text box	Indicates the selected month days and rules. You can also specify values directly in the box, separated by commas.
	Calendar	Name of a user-defined calendar for use with the Month Days parameter to indicate a set of working days. For more information, see Chapter 8, "Using predefined calendars to schedule jobs." In various Control-M and Control-M/EM utilities, this parameter is also known as **DCAL** and **DAYCAL**.
And / Or	Logical connector establishing the relationship between Month Day values and Week Day values.	

Table 32 Scheduling tab parameters (Part 2 of 4)

Parameter	Description	
Week Days	Day(s) of the week on which to schedule the job. This parameter consists of a series of check-boxes for the days of the week (Sunday through Saturday), and a text box. Values can be specified using the check-boxes or the text box. **Note:** Regardless of which method is used, the specified values are displayed both in the text box and the check-boxes above it.	
	Weekday check-boxes	Each day (Sunday through Saturday) is indicated by a separate check-box.
	text box	Indicates the selected week days and rules. You can also specify values directly in the box, separated by commas.
	Example 1,2,3,4,5 would schedule the job on Monday through Friday (assuming the site standard is 0=Sunday, 1=Monday, ... 6=Saturday).	
	Calendar	Name of a user-defined, week-based calendar (WCAL calendar) used together with parameter Week Days to specify a set of working days.
Months	Months in which to order the job.	
Conf Calendar	Calendar used to confirm job scheduling dates. This parameter consists of the following subparameters:	
	name	Name of the calendar.
	Shift	When to schedule the job if the date is not confirmed. (Option) Valid values are:
		■ Ignore Job. Do not shift the job to a different date. The job is not scheduled. ■ Next Day. Shift to the next working date. ■ Prev Day. Shift to the previous working date. ■ No Confcal. Tentatively schedule the job for the current day (even if not a working day). Additional shifting may or may not be performed, depending on the value indicated in the **by n days** box.
	by n days	The number of working days that a job can be shifted. Values from -62 to 62 can be entered. This function is also called **Extended Shift** and **Shift Num**. [z/OS only]
Maxwait	Maximum number of days job can wait for execution after order date. Valid value is an integer between 0 and 99, where 99 indicates no limit.	

Table 32 Scheduling tab parameters (Part 3 of 4)

Parameter	Description	
Retro	(*Only applicable to Table-level RBCs.*) Indicates whether the job will be scheduled for possible execution after its original scheduled date has passed.	
Dates	Dates on which to order the job. Valid values are 4-character dates, in mmdd or ddmm format (depending on the site standard). Dates are inserted into the list separately, followed by the Enter key. A maximum of twelve dates can be specified. If more dates are required, use a calendar.	
Active	Date range during which the job or SMART Table can be ordered or the RBC can be used.	
	From – To	Select **From** to define an active range (during which the job is eligible to be ordered) sandwiched between two inactive ranges. Then specify values for the following: ■ *from date*—earliest date of the active period. ■ *to date*—latest date of the active period. The To date cannot precede the From date. You can optionally leave the From date or the To date blank.
	Until – And From	Select **Until** to define an inactive range (between which the job is not eligible to be ordered) sandwiched between two active ranges (that is: *active-period1* > *inactive-period* > *active-period2*). Then specify values for the following: ■ *until date*—last date of the first active period (*active-period1*) during which the job can be ordered. The inactive period begins the day after this date. ■ *to date*—first date of the second active period (*active-period2*). The inactive period ends the day before this date. The Until date must precede the And From date. Using the Until – And From format, you must specify both dates; you cannot leave either of them blank.
The following fields appear only for Control-M for z/OS jobs.		
Statistics Calendar	Name of the Control-M periodic calendar in which statistics relating to the job are collected. This parameter is relevant only for jobs running in Control-M for z/OS version 6.2.00 or later.	
SAC	Whether to adjust the logical date for a job converted from a scheduling product other than Control-M. This parameter is relevant only for jobs running in Control-M for z/OS version 6.2.00 or later.	

Table 32 Scheduling tab parameters (Part 4 of 4)

Parameter	Description	
PDS	Schedule the job only when the number of tracks in the partitioned dataset falls below the specified minimum. This parameter is generally used for jobs that clean the PDS.	
	Minimum	Minimum number of clean tracks.

To schedule the job on specific days, week days, and months

Most commonly, you will want to specify some combination of months, days of the month, and days of the week. You do this by performing the following as needed:

- Click the days of month in the Month Days area
- Click the days of the week in the Week Days area
- Set the relationship between the selected Month days and Week days by clicking **And** or **Or**.
- Click the months in the Month area.
- Additionally or alternatively, you can specify specific dates (months and days, for example, 08/09) in the date area.

EXAMPLE

The job should be scheduled every day.

1. Click **All** in the Month Days area.
2. Click **All** in the Months area.

EXAMPLE

The job should be scheduled on the first day following the end of each quarter.

1. Click **1** in the calendar in the Month Days area.
2. Click **Apr**, **Jul**, **Oct**, and **Jan** in the Month area.

EXAMPLE

The job should be scheduled every Monday through Friday.

1. Click **All** in the Months area.
2. Click **Mon**, **Tue**, **Wed**, **Thu**, **Fri** in the Week Days area.

Defining scheduling criteria using calendars

When the same schedule is used by many jobs, you can define the schedule in a calendar. For details about defining calendars, see Chapter 8, "Using predefined calendars to schedule jobs."

To use a calendar in the jobs schedule, select the calendar in the Month Days area or the Week Days area. Unless you are applying rules ("Defining complex scheduling criteria using rules" on page 95), there is no difference between those selection fields or their impact.

To limit the calendar to specific days, weekdays or months, click those values. The relationship between them and the calendar is AND (that is, the job will be scheduled only if the calendar and the months, days and weekdays values are satisfied).

NOTE

More complex relationships can be specified for various dates and calendars. For details, see "Defining complex scheduling criteria using rules" on page 95.

EXAMPLE

Schedule the job on all working days of the year. (The Workdays calendar schedules jobs on all working days of the year.)

In the **Calendar** field, select **Workdays**.

EXAMPLE

Schedule the job on all working days in July and August. (The Workdays calendar schedules jobs on all working days of the year.)

1. In the **Calendar** field, select **Workdays**.
2. In the Months area, click **July** and **August**.

EXAMPLE

Schedule the job on all working Mondays in July and August. (The Workdays calendar schedules jobs on all working days of the year.)

1. In the **Calendar** field, select **Workdays**.
2. In the Months area, click **July** and **August**.
3. Click **And**.
4. In the Week Days area, click **Mon**.

Defining complex scheduling criteria using rules

Sometimes required values cannot simply be specified as absolute values, as the following situations illustrate:

- To schedule a job on the last day of the month, clicking **31** in the Month Days area will not work because there are months with 30 days or less.
- You are using a defined calendar, but want to exclude certain days that appear in the calendar.

In such cases, using Rules can be helpful. You can specify Rules by clicking **Rules** in the appropriate (Month Days and / or Week Days) area.

To define complex scheduling criteria using rules

1. To apply rules, click **Rules** in the appropriate area.
2. In the displayed dialog box, click the appropriate tab.
3. Select or fill in the values, as follows:
   - In the Month Days and / or Week Days tab, click the days (you can select multiple values), and then click the rule format button.
   - In the Regular Rules tab, fill in the numeric values only (for example, specify 3, not L3 or +3) in the rule's entry field. Separate multiple values by commas.
   - In the Periodic Rules tab, fill in the numeric value and period only (for example, 3b) in the rule's entry field. Separate multiple values by commas.
4. Fill in other regular scheduling data.
5. If you specified Month Day rules that are relative to a calendar, fill in the calendar name in the Month Day area; If you specified Week Day rules that are relative to a calendar, fill in the calendar name in the Week Day area.

EXAMPLE

Schedule the job on the last day of the month.

1. Click **Rules** in the Month Days area.
2. In the Regular Rules tab, in the field under the label **Order the job on the n-th calendar days counting from the end of the month (Ln)**, enter **1**.
3. Click **OK**.

The results will be as follows:

- In a month with 31 days, the job will be ordered on the 31st day of the month.
- In a month with 30 days, the job will be ordered on the 30th day of the month.
- In a month with 28 days, the job will be ordered on the 28th day of the month.

EXAMPLE

Schedule the job on the last day of the month if that day falls on a workday (Monday - Friday). If the last day is a weekend, shift the scheduling to closest preceding workday.

1. Click **Rules** in the Month Days area.
2. In the Regular Rules tab, in the field under the label **Order the job on the n-th calendar days counting from the end of the month (Ln)**, enter **1**.
3. Click **OK**.
4. Between the Month Days area and the Week Days area, click **And**.
5. In the Week Days area, select **Mon**, **Tue**, **Wed**, **Thu**, and **Fri**.
6. Click **Rules** in the Week Days area, and in the Week Days tab of the Special Week Rules dialog box, select **Saturday** and **Sunday** and click **<n**.
7. Click **OK**.

EXAMPLE

Schedule the job on the 5th and 10th days from the end of the month.

1. Click **Rules** in the Month Days area.
2. In the Regular Rules tab, in the field under the label **Order the job on the n-th calendar days counting from the end of the month (Ln)**, enter **10,5**.
3. Click **OK**.

The results will be as follows:

- In a month with 31 days, the job will be ordered on the 22nd and 27th day of the months.
- In a month with 30 days, the job will be ordered on the 21st and the 26th day of the month.
- In a month with 28 days, the job will be ordered on the 19th and 24th day of the month.

EXAMPLE

Schedule the job on the 1st and 15th day of the month even when they do not appear in the calendar, and to ensure that the job will not be scheduled on the 10th and 25th day of the month even when they appear in the calendar, do the following in the Special Month Days tab.

1. Click **Rules** in the Month Days area.
2. In the Month Days tab
   A. Click **1** and **Ctrl 15** in the tab's calendar.
   B. Click **+n**.
   C. Click **10** and **Ctrl 25** in the tab's calendar.
   D. Click **-n**.
   E. Click **OK**.
3. In the Month Days area, specify the calendar name.

The job will be ordered on every day marked as a working day in the calendar, except on the 10th and 25th; it will also be ordered on the 1st and 15th of the month even if they are not working days in the calendar.

EXAMPLE

Schedule the job on the all days in the calendar except those that fall on Wednesday.

1. Click **Rules** in the Week Days area.
2. In the Week Days tab, click **Wednesday**, and then click **-n**.
3. Click **OK**.

The job will be scheduled on all dates in the calendar unless the date falls on a Wednesday.

EXAMPLE

Schedule the job on the 5th and 10th days of period A, and ensure that the job will not run on the 5th and 10th days of period B.

1. Click **Rules** in the Month Days area.
2. In the Periodic Rules tab
   A. In the field under the label **Order the job on the n-th day of period i from the beginning of the period**, enter **5A, 10A**.
   B. In the field under the label **Don't order the job on the n-th day of period i from the beginning of the period**, enter **5B, 10B**.
   C. Click **OK**.

Limiting scheduling to a particular date range

You can specify a date range during which a job or SMART Table is eligible to be scheduled if other scheduling criteria are satisfied.

This range can be expressed in either of two formats:

- An active period during which a job can be scheduled, sandwiched between two inactive periods:
  (*inactive-period1* > *active-period* > *inactive-period2*)

- An inactive period during which a job cannot be scheduled, sandwiched between two active periods:
  (*active-period1* > *inactive-period* > *active-period2*)

NOTE

The Active parameter appears as a single parameter with several subparameters in the job editing form and the table editing form. In all other Control-M components, the Active parameter appears as two separate parameters that function together — the Active From Date parameter, and the Active To Date parameter. Despite this difference in appearance, which is only a user interface issue, the processing functionality remains the same in all Control-M components.

To define an active date range during which the job can be scheduled

1 In the **Active** field, select **From**.

2 In the field immediately after **From**, select the earliest date the job can be scheduled.

3 In the **To** field, select the latest date the job can be scheduled.

NOTE

Optionally, you can leave either the **From** value blank (for no lower limit), or the **To** value blank (for no upper limit).

EXAMPLE

Limit the dates that the job can be scheduled to: August 6th, 7th, 8th, 9th, 10th, and 11th.

1. In the **Active** field, select **From**.
2. For the **From** value, select **August 6** on the calendar.
3. For the **To** value, select **August 11** on the calendar.

To define an inactive date range during which the job cannot be scheduled

1 In the **Active** field, select **Until**.

2 For the **Until** value, select the last date of the first active period (*active-period1*) during which the job can be scheduled. The inactive period begins the day after this date.

3 For the **And From** value, select the first date of the second active period (*active-period2*). The inactive period ends the day before this date. This date must be later than the **Until** value.

NOTE

When specifying a date range using the Until – And From format, you must specify both values.

EXAMPLE

Do not allow the job to be ordered on: August 6th, 7th, 8th, 9th, 10th, and 11th.

1. In the **Active** field, select **Until**.
2. For the **Until** value, select **August 5** on the calendar.
3. For the **And From** value, select **August 12** on the calendar.

Defining cyclic jobs

A cyclic job can be defined using one of the following methods:

- fixed interval - job runs are separated by the specified interval
- variable interval sequence - job runs are separated according to the specified sequence of intervals
- specific job rerun times - job runs are according to the specified job start times

To define a cyclic job

1 In the Rerun Information area of the Execution tab, select **Cyclic Job** and click **Set**.

2 In the Cyclic Job Run Times dialog box, do one of the following:

- Specify the rerun intervals between job runs, either

  — by selecting the rerun interval and the measurement unit

  — or by entering an interval sequence

  and then select whether the cycle should be measured from the start, end or target (scheduling) time of the current instance.

- Enter specific times for the job runs and select a lateness tolerance.

  For jobs running in Control-M for z/OS specified times can be defined with days offset. For example, if the specified times were:

  13:00, 15:00, 14:00+1, 17:00+2,

  then 13:00 and 15:00 would be submitted at those times on the day of order, 14:00+1 would be submitted at 14:00 on the next order day and 17:00+2 would be submitted at 17:00 two days after the order day.

3 Select the maximum number of reruns.

NOTE

- If **Cyclic Job** is not selected, the job is not affected by the values and rerun descriptions that are displayed in the Rerun Information area.
- Control-M/Server sorts the times entered in Specific Times and runs the job starting from NewDay time (or Order time) according to chronological order, until the next New Day time.

TIP

- To provide logic to stop a cyclic job (for example, if the job ends not OK), create the relevant On statement followed by a Do Stop-cyclic statement in the Steps tab.
- You can use the Maxwait parameter in the Execution tab for cyclic jobs as well as non-cyclic jobs, to determine the maximum number of days the job can remain in the Active Jobs file after its ODAT has passed, if the job has not yet been submitted.

EXAMPLE

A job that updates flight times for an airline should cycle through every 3 minutes from the end of the previous run. If for some reason it fails, it should trigger an alternative flight update program, shout a message to the administrator, and stop running.

1. In the Execution panel
   - Click **Cyclic Job** and **Set**.
   - Select the following rerun cycle: Rerun every **3 minutes** from job's **end**.
   - Select **99** as the maximum reruns value.
2. In the Steps panel, do the following:

   A. Define the following **On** Statement: stmt=***** code=**notok**.

   B. Define the following Do statements:
   - **Do Force Job** Table=**flight** Job Name=**AltUpdate** Date=**ODAT**
   - **Do Shout** To=**Admin** Urgn= **Very Urgent** Msg = **Failure in flight update job**
   - **Do Stop cyclic**

Defining automatic rerun for a job that ends NOT OK

Defining automatic rerun for a job that ends not OK requires that you specify the necessary rerun parameters in the Execution tab, and the On-Do conditional logic to trigger the automatic rerun in the Steps tab.

To automatically rerun a job that ends notok

1 In the Rerun area of the Execution tab, select

- the rerun interval, the measurement unit, and whether the rerun should be measured from the start, end or target (scheduling) time of the current instance
- the maximum number of reruns (0 -99)

2 In the Steps pane, select / specify

- On Statement stmt=* code=Notok
- Do Rerun

NOTE

The maximum reruns value applies only to automatic reruns triggered by the On-Do statements. Reruns that you manually request from Control-M / EM are not counted toward this total.

EXAMPLE

A job that ends not OK should be rerun once. If it still fails, it should trigger an alternative job and shout a message to the administrator.

1. In the Execution panel, do the following:

   A. Select the following rerun cycle: Rerun every **1 minutes** from job's **end**.

   B. Select **1** as the maximum reruns value.

2. In the Steps panel, do the following:

   A. Define **On** Statement: stmt=***** code=**notok**.

   B. Define Do statement: **Rerun**.

   C. Define **On** Statement: stmt=**rerun** code=***rerun*error***.

   D. Define the following Do statements:

   - **Do Force Job** Table=**table1** Job=**AltJob** Date=**ODAT**
   - **Do Shout** To=**Admin** Urgn= **Urgent** Msg = **Rerun JobX failed. Alternate job forced**

Defining jobs that should run on specific nodes

Normally, Control-M / Server can submit a job on any computer having a Control-M / Agent or designated as a remote host for that server.

To have a job submitted on a specific computer

In the **Node ID/Group** field in the Execution tab, select the node ID of that computer.

NOTE

For application type jobs only: If the Node IDs do not appear in the selection list, click **Load**; then select the node ID.

EXAMPLE

A job should only be submitted by the Control-M / Agent resident on the **pqrs3693** host machine.

In the **Node ID/Group** field in the Execution tab, select the **pqrs3693** node ID.

Defining jobs that should run on nodes where load balancing has been implemented

If your site has implemented load balancing, you can define the job to run on a node in a specified load balancing group. Control-M / Server will then select the node in that group according to the load balancing algorithm.

To have a job submitted on a node in a load balancing group

In the **Node ID/Group** field in the Execution tab, select the group. (If the groups do not appear in the selection list, click **Load**; then select the group.)

EXAMPLE

A job must only be submitted on a node belonging to the **UNIX_Group** load balancing group.

In the **Node ID/Group** field in the Execution tab, select group **UNIX_Group**.

Defining a time frame during which jobs can be submitted

To limit the time frame during which Control-M can submit a job, define the time frame in the Activity Period area of the Execution tab.

To define a time frame during which jobs can be submitted

1 To define the earliest time that a job can be submitted, specify the time (in *hhmm* format) in the **Submit between** field in the Execution tab.

2 To define the latest time that a job can be submitted, specify the time (in *hhmm* format) in the (time) **to** field.

3 To link the time frame to a time zone other than the Control-M/Server's time zone (for example, to the Control-M/Agent's time zone), select the time zone in the **Time Zone** field. The time zone selection list provides both geographic name abbreviations and Greenwich Mean Time (GMT) offsets.

NOTE

To ensure that if Control-M did not submit the job before New Day processing for the next day began, it submits the job as soon as possible afterward, specify > instead of a time value in the (time) **to** field.

EXAMPLE

The job should be submitted after 6:00 PM.

In the Execution tab, specify **1800** in the **Submit between** field.

EXAMPLE

The job should be submitted before 10:00 PM in Sydney, Australia.

In the Execution tab, specify **2200** in the (time) **to** field, and select **SYD (GMT + 10:00)** in the Time Zone field.

EXAMPLE

The job should be submitted between 6:00 PM and 10:00 PM.

In the Execution tab, specify **1800** in the **Submit between** field, and specify **2200** in the (time) **to** field.

EXAMPLE

The job should be submitted after 6:00 PM. If it is not submitted before New Day processing the next day, is should be submitted as soon as possible after that New Day processing.

In the Execution tab, specify **1800** in the **Submit between** field, and specify **>** in the (time) **to** field.

Defining that manual confirmation is required before job submission

Submission of a job might depend on a “non-automated” condition be satisfied. For example

- a backup job might require that you load a storage medium into a drive
- a job might require that you first activate an particular external application
- a scheduled job should not be submitted until you have loaded a data file from an external source

To define that a job requires manual confirmation before submission

Check the **Wait for confirmation** check box in the Execution tab. (To actually confirm the job after it has been ordered, right-click the job node in Control-M/EM, and select Confirm.)

TIP

In the job’s documentation file, or the **Description** field in the General tab, you might mention the condition that should be satisfied before someone confirms the job.

EXAMPLE

The BkpDailyTrans backup job requires that an empty CD be mounted as the backup medium.

1. In the Execution tab, check **Wait for confirmation**.
2. (Optionally, write in the **Description** field in the General tab: **Mount empty CD before confirming backup**.)

Assigning priorities to jobs and defining and critical jobs

You can assign priorities to jobs by specifying 2-character alphabetic or numeric values as follows (where AA is the lowest priority and 99 is the highest priority):

AA-A9 ... ZA-Z9, 0A-0Z, 01-09, 1A-19 ... 9A-99

You can indicate that a job is a critical job by specifying an * symbol in the **Priority** field and clicking the **Critical** field.

Priority and critical logic works as follows:

- If available resources are sufficient to submit a lower priority job or higher priority job but not both, they will be used for the higher priority job.
- If available resources are sufficient to submit a lower priority job but not a higher priority job, the lower priority job will be submitted.
- If available resources are sufficient to submit a lower priority job but not a critical job, the resources will be held until all resources required by the critical job are available, and then the critical job will be submitted.

EXAMPLE

The TransUpd01 and TransSumm01 jobs each require 35% of the CPU, but TransUpd01 is a much higher priority job.

1. In the **Priority** field in the Execution tab of TransUpd01, define a priority of **06**.
2. In the **Priority** field in the Execution tab of TransSumm01, define a priority of **X4**.

If there are only enough resources for one of the jobs to run, TransUpd01 will run first.

EXAMPLE

The TransUpd01 job requires 35% of the CPU, the TransSumm01 job requires only 15% of the CPU, but TransUpd01 is a much higher priority job than TransSumm01.

1. In the **Priority** field in the Execution tab of TransUpd01, define a priority of **06**.
2. In the **Priority** field in the Execution tab of TransSumm01, define a priority of **X4**.

If only 20% of the CPU is available, TransSumm01 will be submitted before TransUpd01.

EXAMPLE

The TransUpd01 job requires 35% of the CPU, the TransSumm01 job requires only 15% of the CPU, but TransUpd01 is a critical job.

1. In the **Priority** field in the Execution tab of TransUpd01, define a priority of *****, and then click **Critical**.
2. In the **Priority** field in the Execution tab of TransSumm01, define a priority of **X4**.

If only 20% of the CPU is available, Control-M reserves that CPU until another 15% of the CPU is free, and then submits TransUpd01.

Defining how many days a job can await submission

It can happen that a scheduled job does not get submitted on the day it is scheduled, for example if its submission criteria have not been satisfied. Using the Maxwait parameter in the Execution tab, you can define the maximum number of days that such a job can remain in the Active Jobs file awaiting submission.

To define how long a not submitted job should remain active

In the Maxwait field in the AJF Retention area of the Execution panel, select the maximum number of days the job can remain active.

EXAMPLE

If the ABC job is not submitted on the day it is scheduled, it should remain active until it is submitted, up to a maximum of 3 days, at which time, if it has not been submitted, it should be cleaned during New Day processing.

Set **Maxwait** to **3**.

Defining dependencies for the current job

You define dependencies between jobs by means of In prerequisite conditions and Out prerequisite conditions that you define in the Conditions tab.

- By defining an In prerequisite condition, you establish the requirement that the condition must exist in the active environment before the job can be submitted.
- By defining an Out prerequisite condition, you establish that the condition is added to (or deleted from) the active environment when the job ends.

The most basic usage of prerequisite conditions to establish dependencies is as follows:

- In a predecessor job, define an Out prerequisite condition to be added to the active environment when the job ends OK.
- In the successor job, define this same condition as an In prerequisite condition.

NOTE

Alternatively, you can create job dependencies by simply clicking and dragging between job nodes in the flow diagram. This will automatically generate the In and Out prerequisite conditions.

TIP

If an In prerequisite condition in a successor job is no longer needed after the successor job runs, you can have the successor job delete that condition by define it as an Out prerequisite condition to be deleted. This is especially useful if the job might be run more than once (for example, cyclic or rerun jobs). It also helps eliminate clutter from the active environment even before New Day processing is run the following day.

To define prerequisite conditions

1 To define In prerequisite conditions, do the following in the In condition area of the Conditions tab:

A Specify the name and date of each required condition. The most common date value is **ODAT**, which resolves to the job's original scheduling date. Dates must be 4-characters. Table 33 lists the complete set of valid dates that can be specified for an In and Out condition.

B If you are defining multiple In prerequisite conditions, select the relationship between the conditions in the list box. If the relationship is complex (that is, a combination of **And** and **Or**), select **Set relationship manually**, which adds columns that let you specify a relationship parameter and parentheses on each line; fill in these columns as needed. You cannot nest parentheses.

You can use the buttons above the area to add, delete, copy or move conditions.

2 To define Out prerequisite conditions, do the following in the Out condition area of the Conditions tab: For each condition, specify the condition name and date (see Table 33), and in the **Effect** column, indicate whether the job should add (+) or delete (-) the condition when the job ends.

You can use the buttons above the area to add, delete, copy or move conditions.

Table 33 Valid date values for In and Out conditions (Part 1 of 2)

Date Value	Description
date	4-digit date in **mmdd** or **ddmm** format, depending on the site standard.
offset	+ or - followed by a number from 0 through 999, indicating the number of days in the future (+), or in the past (-), relative to the actual order date. This value is valid only for jobs running in Control-M for z/OS version 6.2.00 or later.
ODAT	Original scheduling date of the job.
PREV	Previous scheduling date of the job.
NEXT	Next scheduling date of the job.

Table 33 Valid date values for In and Out conditions (Part 2 of 2)

Date Value	Description
STAT	The condition is not date-dependent.
	Note: This value is valid only for Control-M/Server version 6.0.01 and above, and for Control-M for z/OS.
****** or $$$$**	Any scheduling date.

EXAMPLE

Job1 and **Job2** are predecessors of **Job3**. Define the necessary conditions in the Conditions tab for **Job1**, **Job2**, and **Job3**, as follows:

- In **Job1**, define that the job should add a **Job1-EndedOK** Out condition.
- In **Job2**, define that the job should add a **Job2-EndedOK** Out condition.
- In **Job3**, define **Job1-EndedOK** and **Job2-EndedOK** In conditions (that is, that these conditions must exist before the job is submitted).
- If the **Job1-EndedOK** and **Job2-Ended OK** conditions are no longer needed after **Job3** successfully ends, remove them from the active environment after **Job3** ends by defining them as Out conditions to be deleted in **Job3** (when defining the Out condition, select **-** in the **Effect** column).
- If **Job3** is a predecessor job to another job, define that it should add a **Job3-EndedOK** Out condition, which can then be specified as an In condition in a successor job of **Job3**.

TIP

After defining job dependencies, you can use the loopdetecttool utility to detect loops in conditions. For details, see the *Control-M Utility Guide*.

Allocating resources for a job

To ensure that a job is not submitted for execution before required resources are available, you identify available resources to the system in Control-M/EM (for details, see Chapter 15, "Identifying data center resources available for Control-M use"), and then define the resources required by the job here in the Resources tab. Resources can be of one of two types:

- Quantitative Resources — these are resource definitions for which you specify in Control-M/EM an overall quantity available to the Control-M, and the amount required by the job in the Resource tab. Examples of quantitative resources you might define are **CPU (%)**, **RAM (MB)**, **Hard Disk (GB)**, and **Tape Drives (#)**.

- Control Resources — these are resource definitions for which you specify the type of control the jobs needs (Exclusive or Shared). They are often used to represent files or databases.

Use the buttons above the areas to add lines, delete, copy or move resources.

EXAMPLE

Quantitative Resource Usage

A job will use 56% of the processing capacity of the CPU, and 12 Gb of the hard disk.

- In Control-M/EM, choose **Tools =>Quantitative Resources** and define the following quantitative resources and their total quantities in the Control-M/Server (if not already defined):

  — **CPU (%)**
  — **Hard Disk (Gb)**

- In the Resources tab in the job editing form for the job, define the following resources and their required usage values:

  — A quantitative resource called **CPU (%)** with a required usage value of **56**.
  — A quantitative resource called **Hard Disk** with a required usage value of **12**.

EXAMPLE

Control Resource Usage

A job requires exclusive control of the Employees Weekly Timesheets file.

- In Control-M/EM, choose **Tools =>Control Resources** and allocate a control resource called Employees Weekly Timesheets.

- In the Resources panel of the job editing form, specify that the job requires exclusive control over the Employees Weekly Timesheets file.

While the resource (the file) is currently in use by another job, this job will not be submitted. While this job is currently running, another job that needs the resource will not be submitted.

Defining and using variables that are dynamically resolved at runtime

By specifying AutoEdit variables in job scripts and job processing definitions, you can eliminate the need to change the scripts and job processing definitions before job submission. For example, if a job ID run date must appear in a file name, you can use an AutoEdit variable to represent the ID or date. AutoEdit variables are resolved at time of job submission, during job execution, or immediately following job execution (depending on the variable).

NOTE

When AutoEdit variables are used in post processing, as part of On or Do statements, they are re-evaluated.

AutoEdit terms are prefixed by the %% symbol. Predefined AutoEdit terms include system variables, functions and operators.

You can also define user-defined AutoEdit variables using the Set tab or (or Do Set Var statements in the Steps tab) in the job editing form. Definition of user-defined variables requires that you specify the following elements:

- variable name — this is a user-assigned name that must have a valid AutoEdit prefix. The most common prefixes are

  — %% for local variables

  — %%/ for global variables

- value — this is an expression or formula used for determining the value to be assigned during job processing. This expression or formula can be made up any combination of literals, constants, and AutoEdit system variables, functions operators, and user defined variables.

Besides using AutoEdit terms in the job script, you can use them in several places in the job editing form, including

- Shout and Do Shout statements
- Sysout and Do Sysout statements
- Do Mail statements

For detailed instructions regarding the AutoEdit facility components and usage, see the *Control-M Parameter Guide*, and for mainframe Control-M users, see the *Control-M for z/OS User Guide*.

NOTE

Application-specific job parameters may not be specified in AutoEdit variables. The names of application-specific job parameters are prefixed by two percent signs, the application's abbreviation and a hyphen (for example, %%SAPR3- for SAP, %%OAP- for Oracle E-Business Suite).

To define and assign values to user-defined AutoEdit variables for use in job scripts

1 Do one of the following:

- To define and assign a value to an AutoEdit variable unconditionally, display the Set tab.
- To define an assign a value to an AutoEdit variable if conditional criteria are satisfied
  - display the Steps tab
  - define the condition criteria in an On statement
  - click Do and select Set-var as the Do statement

2 In the **Var Name** field (or the **name=** field of a **Do Set-var** statement), specify the name to be assigned to the variable. Ensure that you prefix the name with a valid AutoEdit prefix.

3 In the **Value** field, specify the expression or formula to be used to assign the value to the variable. This formula can consist of any combination of literals, constants, AutoEdit system variables, user-defined variables, functions, operators and relationship indicators. For more information, see the *Control-M Parameter Guide*, and for mainframe Control-M users, see the *Control-M for z/OS User Guide*.

EXAMPLE

The job script must access a file called BranchTrans with the current date as a suffix (for example, BranchTrans_061025).

Specify in the job script the file name **BranchTrans_%%Odate**.

EXAMPLE

A user-defined variable for the day before yesterday is needed in the job script.

In the Set tab, define the user-defined variable as follows:

1. In the **Var name** field, specify **TwoDaysAgo**.
2. In the **Value** field, specify **%%Day %%Minus 2**.

Note: %%Day is a system variable; %%Minus is an operator.

EXAMPLE

If the job ends Not OK, shout an appropriate message containing the completion code.

In the Step tab, define the following:

- On Statement **stmt=*** **code=**NOTOK
- Do Shout **To=EM Urgn =Very Urgent Msg=Job %%JOBID ended NOTOK. Completion code: %%COMPSTAT**

EXAMPLE

To distinguish between SYSOUT iterations of a cyclic job, rename the SYSOUT file with a counter.

1. To track the number of iterations in a cyclic job, define the following user-defined variable in the Set tab:
   - **Var name**= **%%counter**
   - **Value** = **%%counter %%plus 1**
2. To rename the SYSOUT, in the PostProc tab, do the following:

   A. In the **Sysout Handling** field, select **Copy**.

   B. In the displayed **File Name** field, specify **%%JOBNAME.SYSOUT.%%counter**.

Defining postprocessing actions that depend on job processing results

To define postprocessing actions that are conditional upon the job processing results, you use the Steps tab to define On statements and accompanying Do statements:

- On statements—identify the job processing results that will determine if the accompanying conditional (Do) actions are to be performed.
- Do statements—identify the actions to perform when the On statement criteria are satisfied.

NOTE

You fill in On statements differently for z/OS jobs than for other jobs. For details on filling in On statements for z/OS jobs, see "Defining conditional processing under z/OS" on page 121.

To define conditional postprocessing actions

1 In the Steps panel of the job editing form, click the arrow below the On/Do heading and select **On**. Before performing the next step, note the following points:

- To fill in On criteria, you supply two values:
  - statement
  - code
- You can define On criteria that depend on values returned from any of the following:
  - job SYSOUT — processed by the agent
  - job completion code —processed by the server
  - job completion status — processed by the server

NOTE

The **Step Codes** grid rows can be displayed in Compact or Expanded format. To adjust the format do the following:

1. Click **Tools** => **Options.**
2. In the **General** section check the **Use compact Step Codes grid** box to compact the rows in the grid or uncheck to display in expanded format.

2 In the displayed On statement, fill in the **stmt=** and **code=** values:

- To make the processing conditional on a particular completion code, fill in the fields as follows:
  - In the **stmt=** field, specify *****.
  - In the **code=** field, specify a string in the **COMPSTAT** *operator completioncode* format:

Valid values for *operator* are: **=**, **EQ**, **<**. **LT**, **>**, **GT**, **!** (not equal to), or **NE**. If you specify **EQ**, **L**T, **GT**, or **NE**, you must place a blank before and after the value.

Valid values for *completioncode* are either a literal completion code, or the value **Even** or **Odd** (which are satisfied by any even or odd completion codes).

- To make the processing conditional on a particular completion status, fill in the fields as follows:

  — In the **stmt=** field, specify ***.**
  — In the **code=** field, specify one of the following completion statuses:

  OK

  NOTOK

  JLOST (the Do statements are performed if the job's SYSOUT cannot be found due to disappeared jobs)

- To make the processing conditional on a particular result from the SYSOUT, fill in the fields as follows:

  — In the **stmt=** field, specify the job script statement (as formatted by the control module).
  — In the **code=** field, specify the operating system response (as formatted by the control module).

NOTE

- On statements that depend on the job SYSOUT are checked against statements passed from the SYSOUT by the relevant Control Module, and therefore must be in the same format as the statements passed by the Control Module.

  — For information on how control modules format the job script and operating system responses, see the appropriate *Control Module Administrator Guide*.

  — For formatting instructions for job types designated as OS (the default), and for a description of the logic used to determine if On criteria are satisfied, see the description of the On parameters in the *Control-M Parameter Guide*. Also, see the following example.

- You can use *, ?, and $ wildcards. (In Chinese, Japanese and Korean character sets: The ? and $ wildcards are not supported. The * wildcard is supported only as a standalone value or as a suffix to another value; it cannot be embedded in, or act as a prefix to, another value.)

- You cannot use AutoEdit variables.

EXAMPLE

Defining On statements relating to the SYSOUT

A job script requests (among other things) that the operating system run the following commands (which it does):

```
pwd          (this is request to run a Dir command on the specified directory)
ls           (this is a request to list the files in found in the Dir request)
```

The job's SYSOUT contains the following results from these requests.

```
+pwd
/data/wrkfle
+ls
file1
file2
dir1
dir2
```

To define the On criteria, you must know the format of the SYSOUT data as formatted and returned by the Control Module. The data is formatted as follows:

data returned by the Control Module

- statement= pwd code= /data/wrkfle
- statement=ls code= file1
- statement=ls code=file2
- statement=ls code=dir1
- statement=ls code=dir2

Assume that the On statement is satisfied if the ls request returns a value beginning with the prefix **dir**. Define the following On (and Do) statements in the Steps tab:

```
On statement stmt= ls   code=dir*
Do ...
```

3 Press **Enter**.

4 To add more On statements repeat the process. The relationship between multiple On statements in the same On-Do block is And (they must all be satisfied).

5 After defining the On statement(s) in the On-Do block, define the Do actions as follows:

A Click the arrow below the On/Do heading and select **Do**.

B Select the Do action, and then fill in the values for the displayed fields. Table 34 lists possible Do actions and where useful, the parameters that can activate those actions. For a brief explanation of Do actions, and where useful, the parameters that can activate those actions, see Table 34. For a complete explanation of the Do statement parameters, see the *Control-M Parameter Guide*.

C Repeat this process to define as many Do actions as needed. The relationship between them is AND (if the ON criteria are satisfied, all the Do actions in that block are performed).

You can define as many On-Do blocks as needed. Use the buttons above the areas to add lines, delete, copy or move On or Do statements.

Table 34 DO actions (Part 1 of 2)

Desired Action	Parameter
To set the job's completion status to OK regardless of the job's completion status. (This statement has no subparameters.)	**Do OK**
To set the job's completion status to NOTOK regardless of the job's completion status. (No subparameters.)	**Do NOTOK**
To cause the job to be rerun according to the parameters specified in the Rerun parameter. No subparameters.	**Do Rerun**
To stop the cyclic job from running.	**Do Stop Cyclic**
To assign a value to an AutoEdit variable. You must specify the name of the variable, and the value to which the variable should be set. **Note:** This parameter is also called **Do AutoEdit** or similar in various Control-M products (and the *Control-M Parameter Guide*). Valid values can either be a constant value or a resolvable AutoEdit expression. **Note:** Do not specify any application-specific job parameters (which are also prefixed by two percent signs, as well as the application's abbreviation and a hyphen; for example, %%SAPR3- for SAP, %%OAP- for Oracle E-Business Suite). For more information about AutoEdit expressions, see the *Control-M Parameter Guide*.	**Do Set-Var**
To send ("shout") a message to a destination. You must specify a destination, degree of urgency, and the message text as subparameters.	**Do Shout**
To force a job or a complete table to be ordered under Control-M regardless of the scheduling criteria. You must specify as subparameters the name of the table (to be forced or containing the job to be forced), the scheduling date to use, (and for z/OS, the library containing the table).	**Do Force-job**

Table 34 DO actions (Part 2 of 2)

Desired Action			Parameter
To specify how the job's output should be handled. The following subparameter fields are displayed for this DO statement:			**Do Sysout**
	option	SYSOUT option code (list box). The following options are available: ■ **C** Change job class. ■ **F** Copy output. ■ **D** Delete output. ■ **N** Move output. ■ **R** Release for Printer.	
	PRM	Relevant SYSOUT data. The appropriate value depends on the option code above. For use with codes F, C or N. (Text) ■ For option **F**, specify the file name. ■ For option **C**, specify the New class (one character) or * to indicate the jobs original MSGCLASS. ■ For option **N**, specify the new destination (up to 8 characters).	
	FROM	From class. Limits the SYSOUT handling operation to SYSOUTs originating in the specified class.	
To add or delete a prerequisite condition. You must specify as subparameters the condition name and date, and whether to add or delete the condition.			**Do Condition**
To e-mail a message. Under the **Parameters** heading you must specify as subparameters the **To=**, **Subject=**, and **Msg=** fields. These details can also be entered in the Mail dialog box (displayed by clicking the arrow in the Details field) along with the following additional fields: **Cc:**, **Urgency:**, and **Attach SYSOUT:**. Valid values for **Attach SYSOUT:** are: ■ Yes ■ No ■ Default (This subparameter takes its value from the ADD_SYSOUT_TO_EMAIL configuration parameter)			**Do Mail**
To open or close a Remedy ticket. You must specify as subparameters a problem summary, description, and the problem urgency. AutoEdit terms are supported.			**Do Remedy**

EXAMPLE

If the word “error” appears anywhere in the SYSOUT, shout to the Administrator.

On Statement **stmt= * code= *error***
Do Shout **To= Admin Urgency: Very Urgent Msg= Potential error in Job *%%jobid***

EXAMPLE

Any even completion code should cause the job to end OK.

On Statement **stmt= * code= COMPSTAT EQ Even**
Do **OK**

EXAMPLE

If the job ends NOTOK, add a condition that triggers a job that now becomes necessary.

On Statement **stmt= * code= NOTOK**
Do **Condition Name=JobX_NotOK Date= odat sign= +**

EXAMPLE

Set the status of the job to NOTOK if the SYSOUT indicates that the password directory is not found. In such a case, the SYSOUT of the UNIX job might contain the following:

```
cp  /etc/passwd /tmp
cp  /etc/passwdx /tmp
cp: /etc/passwdx: No such file or directory
cp  /etc/passwd /usr/kvm/xyzzy
cp: /usr/kvm/xyzzy: Permission denied
exit 12
```

On Statement **stmt= cp/etc/passwdx/tmp code= cp*no*file**
Do **NOTOK**

EXAMPLE

Rerun the job if the SYSOUT indicates that a particular file to be copied was not found:

On Statement **stmt= copy job411.dat code= File not found**
Do **Rerun**

Defining conditional processing under z/OS

When defining On statements for jobs running under z/OS, you specify the particular start and end procedure and program step to be checked for a particular code result. Optionally, you can define and name step ranges, and then reference the step ranges by specifying their names (preceded by an asterisk) in On statements.

1 To define a step range, in the Step Range area of the Steps panel, do the following:

A Specify a name for the step range.

B Fill in the start program and procedure step and the end program and procedure step.

C Repeat for as many step ranges as you want to define.

2 To define On statements (other than On Sysout), do the following:

A Click under the On/Do header, and select **On**.

B Click under the Type header and select **Statement**.

C Specify the program step. Alternatively you can specify

- **step_range_name*
- ANYSTEP (code criteria can be satisfied in any step)
- +EVERY (code criteria must be satisfied in every step)

D Specify the procedure step. Alternatively you can specify

- (blank)
- +EVERY (code criteria must be satisfied in every step)

E Specify the codes that will satisfy the On step criteria. You can precede them with relational operators <, >, or N (not). Most codes will be in one of the following formats:

- C*nnnn* - step condition code, where *nnnn* is a 4-digit value.
- S*xxx*—Step system abend code where xxx is a 3-character hex value.
- U*nnnn*—Step user abend code, where *nnnn* is a 4-digit value.
- Keyword value such as **JLOST**, **JNRUN**, and **JFAIL**, **OK**, and **NOTOK**.

For for information, and rules regarding usage, see the description of the On statement in the *Control-M Parameter Guide*.

NOTE

The **N** qualifier indicates that the DO statements must not be performed if the specified condition exists. It does not indicate that the DO statements must be performed if the specified condition does not exist.

3 To define an On Sysout statement, do the following:

A Click under the On / Do header, and select **On**.

B Click under the Type header and select **Sysout**.

C In the **Sysout=** field, specify a string or pattern to check for in the SYSOUT (blanks are invalid characters).

D Specify the From column and To columns of the SYSOUT to be checked for the string or pattern.

4 To define additional On Statements in the block, specify an **And** or **Or** relationship between the current statement and the new statement to be defined. A new On statement for you to fill in will be automatically opened.

5 When the On block is as it should be, fill in the Do actions as follows:

A Click under the On / Do heading, and select **Do**.

B Click under the Type header, and select the Do statement.

C Fill in the displayed fields. For a complete explanation of the Do statement parameters, see the *Control-M Parameter Guide*.

D Repeat as necessary.

EXAMPLE

If Step1 ends with a condition code of C0004, and Step 5 ends with system abend code S0C4, perform the indicated Shout.

```
On Statement PGMST= Step1 PROCST=      Codes=C0004      AND
On Statement PGMST= Step5 PROCST=      Codes=S0C4
Do Shout      To=emuser     Urgn=Regular      Msg= Backup operations ...
```

Defining messages to be shouted at the end of job processing

NOTE

Shout statements in Control-M for z/OS allows additional values beyond those described below. For details, see the *Control-M for z/OS User Guide* or the *Control-M Parameter Guide*.

1 In the PostProc tab, click **When** and select the situation in which Control-M should shout the message, and if necessary, specify the accompanying parameters in the **Param** field. Use the following table as a guide.

Situation	When option	Parameters
The job completion status is ended OK	OK	(none)
The job completion status is NOTOK	NOTOK	(none)
The job completion status is RERUN	RERUN	(none)
The job has not been or cannot be submitted by the specified time	Late Sub	time in *hhmm* format (from 0000 through 2359).
The job does not finish executing by the specified time	Late time	time in *hhmm* format (from 0000 through 2359).
The job's elapsed runtime is outside of a specified limit	Exectime	According to the format specified, Shout the message if the elapsed runtime is ■ >*n*—is greater than *n* minutes (1-999). ■ <*n*— is less than *n* minutes (1-999). ■ +*n*—exceeds the job's average execution time by at least *n* minutes (1-999). ■ -*n*—is less than the job's average execution time by at least *n* minutes (1 – 999). ■ +*n*%—exceeds the job's average execution time by at least *n*% (1 – 900) ■ -*n*%—is at least *n*% less than its average execution time. (1 – 999). You can specify more than one parameter in a Shout When Exectime statement.

2 In the **To** field, specify the Shout destination in the Control-M. Valid values are

- user ID
- user e-mail
- a specific terminal
- system console
- alerts window (specify **EM** as the To destination)
- Control-M log

3 Select the message urgency (regular, urgent or very urgent).

4 Specify the message (1 -255 characters).

5 Repeat these steps as necessary to shout as many messages needed in different situations. You can use the buttons above the Shout area to add, delete, copy or move shout statements up and down.

NOTE

Shout When Late Sub applies only if the job is not submittable (that is, if a runtime criterion such as an in condition or quantitative resource is not satisfied) at the specified time. However, if a job is ordered after the specified time but starts running immediately because it meets all runtime criteria, the Late Sub parameter doesn't apply.

EXAMPLE

If the BackupAllSystems job ends not OK, shout an alert indicating the job's completion code.

In the PostProc tab, do the following:

1. In the **When** field, select **NOTOK**.
2. In the **To** field, specify **EM**.
3. In the **Urgency** field, select **Urgent**.
4. In the **Message** field, specify **Backup failed. Completion code=%%COMPSTAT**.

EXAMPLE

Other jobs depend on the CalcExpenses job being executed in a timely fashion. If the CalcExpenses job does not finish executing by 8:00 PM, shout an appropriate very urgent message to the Administrator.

In the PostProc tab, do the following:

1. In the **When** field, select **Late Time**.
2. In the **Param** field, specify **2000**.
3. In the **To** field, specify **Admin**.
4. In the **Urgency** field, select **Very Urgent**.
5. In the **Message** field, specify **Job CalcExpenses not completed by 8:00 PM.**

EXAMPLE

If the CalcSalary job executes in less that half its average execution time, there might be a problem with the data being used. Shout a message to the Payrol234 user Id.

In the PostProc tab, do the following:

1. In the **When** field, select **Exectime**.
2. In the **Param** field, specify **-50%**.
3. In the **To** field, specify **Payrol234**.
4. In the **Urgency** field, select **Urgent**.
5. In the **Message** field, specify **Job CalcSalary completed quickly. Check data and results.**

Defining how to handle the job's sysout when the job ends OK

1 In the PostProc tab, in the **Sysout Handling** field, select required handling.

2 For the following SYSOUT handling, specify the require parameters in the displayed field, as follows:

- For sysout being copied, specify the full path and name for the target file.
- For sysout being moved, specify the full path for the target destination.
- For sysout being printed (released), specify the target printer.

EXAMPLE

If the job ends OK, print the SYSOUT on the EWH14 printer.

In the PostProc tab, do the following:

1. In the **Sysout Handling** field, select **Release**.
2. In the displayed **Printer Name** field, specify **EWH14**.

Archiving sysdata (z/OS only)

You can archive the job's SYSDATA to a common data set. If you do, you can (optionally) specify how many days, and for how many job runs, to retain the archived SYSDATA.

To archive the job's sysdata to a common data set

1 In the Archiving area of the PostProc tab, click in the **SYS DB**.

2 Optionally, specify one or both of the following types of retention criteria:

- number of days (00–99) to retain archived SYSDATA
- number of job runs (000–999) for which to retain the SYSDATA.

EXAMPLE

Archive the SYSDATA and retain it for 30 days.

In the PostProc tab, do the following:

1. Click **SYS DB**.
2. Specify **30** in the **Max Days to retain archived SYSdata** field.

Annotating activities

When a user performs any action that affects the Control-M/Enterprise Manager/Enterprise Manager environment the **Audit Annotation** prompt window is displayed prior to saving or completing the action.

The user must enter a purpose for performing this action in the **Subject** field and a justification or descriptive note in the **Description** field. Recent activities and descriptions can be selected using the drop-down menus in these fields.

When using the Command Line Interface utility or the XML utility, annotation details can be provided by special command line flags. For details see the *Control-M Utility Guide*.

If a bulk operation (for example, writing a table with multiple jobs) is being performed, the user will be prompted to provide a single annotation which will be applied to each item in the entire operation.

The subject and description information provided by the user is saved with the audit report and can be viewed using the Reporting facility. For more information see "Generating a report" on page 326.

Which activities require annotation is defined by the system administrator using the Control-M Configuration Manager. For details see the *Control-M Administrator Guide*.

Creating and editing SMART Tables

This section contains the following topics:

Defining general SMART Table information
Defining scheduling criteria for a SMART Table
Defining dependencies, variables, and notifications in the SMART Table
Defining actions to be performed after all scheduled jobs in the SMART Table have ended
Creating and editing Sub-tables
Modifying dependencies for jobs within a SMART table

When creating a SMART Table, in addition to defining the basic set of table definition parameters (Control-M and table name), you must define the extended set of table definition parameters that determine how the table will handle its jobs as a unified unit.

SMART Tables can also contain nested Sub-tables. These Sub-tables inherit scheduling criteria from their parent tables. The highest SMART Table in a nested hierarchy is referred to as the outermost table.

In many ways, you interface with a SMART Table as you do job processing definitions. For example, you can edit or browse the SMART Table definition much as you would a job processing definition and many actions you can perform on job processing definitions can also be performed on SMART Tables.

You define SMART Table parameters in a form called the table editing form. This form is very similar to the job editing form used for defining job processing definitions, and the definition tasks are also very similar.

NOTE

- Because most details of the table editing form are similar to the details of the job editing form, instructions for those details are not repeated here. Instead, see "Creating and editing jobs" on page 83.
- The Scheduling tab of the table editing form provides additional scheduling functionality compared to what is found in the job editing form.
- This section describes details that are unique or different for the SMART Table.

Fill in the criteria as you would for a job, but keep in mind that the SMART Table will apply its scheduling criteria to all the scheduled jobs as a whole.

Defining general SMART Table information

When filling in the General tab of the table editing form, the following require special consideration:

- Specifying the table type
- Specifying a SMART Table name
- Ignoring prerequisite conditions if the predecessor jobs that set them are unscheduled

Specifying the table type

Specify whether a table is a SMART Table. By clicking the SMART check-box at the top of the General tab in the Table Editing Form, the table can be defined with an extended set of table definition parameters and can include Sub-tables.

If you are defining a table and enter a value in a field that is only available in a SMART Table a confirmation message will be displayed. The message asks you to confirm that the table will become a SMART Table. If you do not confirm then any definitions that are only available for SMART Tables will be lost.

Tables can be changed from SMART to simple in Control-M/Enterprise Manager, and vice versa, at any time. If an existing SMART table is changed to a table without SMART attributes, then some of the SMART table's data will be lost. If a SMART has nested Sub-tables associated with it, it cannot be changed.

Specifying a SMART Table name

Specify the name of the SMART Table in the **Table** field. The name you assign to the SMART Table appears in the SMART Table node in the flow diagram and in the Job List window.

SMART Tables also have a **Job Name** or **MEM Name** field depending on if it is a distributed system table or CONTOL-M for z/OS table. A new SMART Table will generally have the same value in both the **Table** and **Job/MEM** name fields. In these cases the **Job/MEM** name value is hidden.

Ignoring prerequisite conditions if the predecessor jobs that set them are unscheduled

If predecessor jobs in a SMART Table are not scheduled on a day that successor jobs are scheduled, the conditions required by the successor jobs cannot be satisfied, and by default the successor jobs are not submitted. However, you can override this default. To instruct Control-M to ignore prerequisite condition requirements if the predecessor jobs that set them are not scheduled, in the **Adjust Condition** field in the Execution tab of the table editing form, select **Yes**. (The default is **No** — required conditions are not ignored.)

Defining scheduling criteria for a SMART Table

The Scheduling tab of the SMART Table editing form is similar to the Scheduling tab of the job editing form, but in addition it enables you to define multiple Table-level and select Control-M level RBCs. These are sets of scheduling criteria that can be associated with jobs and Sub-tables in the SMART Table.

NOTE

Control-M level RBCs are applicable when using Control-M Server version 7.0.00 and later.

A SMART Table is ordered when its RBCs have been calculated and the scheduling criteria has been met. A row is added in the Active Jobs file for the table. The contents of the SMART table, jobs and Sub-tables, then pass the order procedure. A job's scheduling criteria is calculated as well as its AND/OR relationship with the SMART table or Sub-table it belongs to. The RBCs of a Sub-table are calculated and if the scheduling criteria is met a row is added in the Active Jobs file for the Sub-table and its contents is ordered.

The Scheduling tab must contain at least one set of scheduling criteria that can be associated to the job processing definitions in the SMART Table (you can define multiple sets of scheduling criteria). To each set of scheduling criteria that you define in a SMART Table, you assign a unique name in the RBC name list.

You can then associate any of these sets of scheduling criteria to a job or nested Sub-table in the SMART Table by:

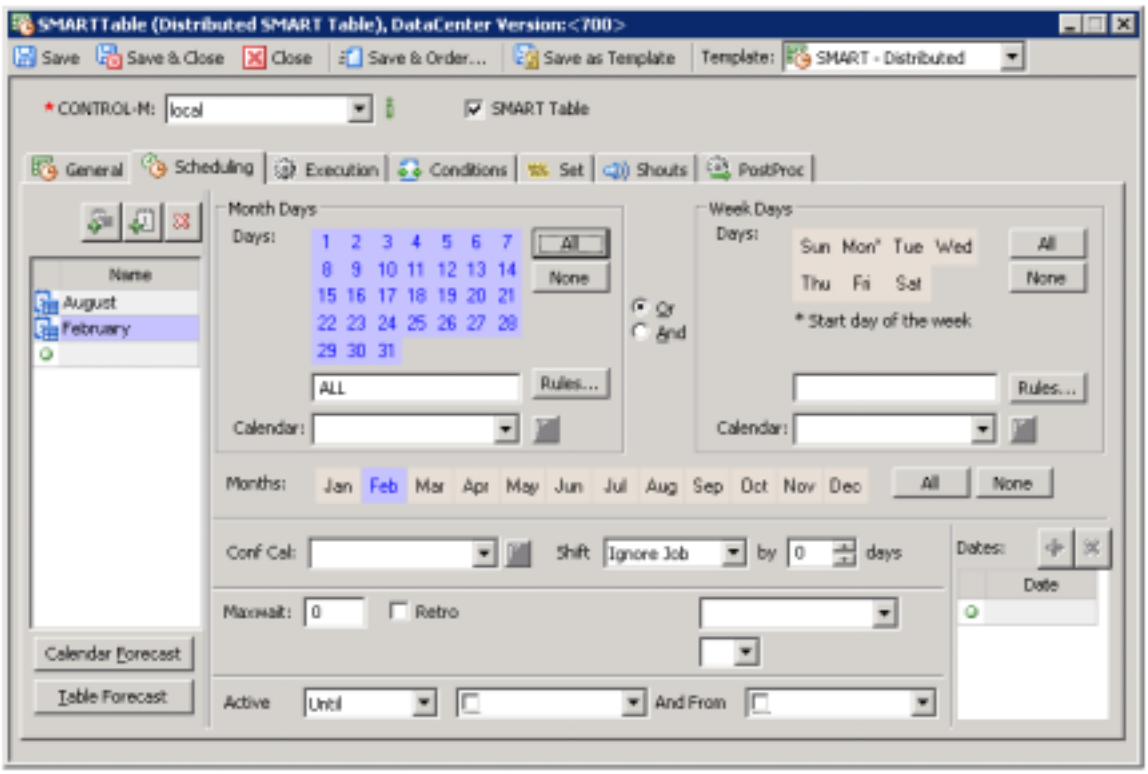
- selecting the RBC name in the job processing definition's Scheduling tab

- selecting the RBC name in the Scheduling tab of the Sub-table editing form.

NOTE

When the same or similar RBCs are used in different SMART Tables, you can copy them from one SMART Table to another rather than defining them manually. For details, see "Copying RBCs from one SMART Table to another" on page 138.

Figure 6 Scheduling tab in the SMART Table editing form



The procedures for defining Table-level RBCs and selecting Control-M level RBCs are similar whether the RBCs are being associated with a template, job, or SMART Table.

Control-M level RBCs are only supported by Control-M Servers version 7.0.00 or later.

To define Table-level RBCs in a SMART Table:

1 In the left side of the Scheduling tab, click on the **Create local Rule-Based Calendar** button, and type a name in the high-lighted row in the RBC name list. The name can later be used to identify the set of scheduling criteria.

2 Fill in the scheduling criteria as you would for any job, as described in "Defining scheduling criteria for a job—basics" on page 88.

3 To define additional RBCs, repeat the above process.

NOTE

- For z/OS groups, only uppercase letters are allowed in RBC names.
- RBC names for groups on non-z/OS platforms are case sensitive.

To select Control-M level RBCs in a SMART Table:

1 In the left side of the Scheduling tab, click on the **Select Rule-Based Calendar** button. The Select RBC window opens.

2 In the Select RBC window select one of the following options:

- All Parent - All RBCs of the direct parent are associated with the SMART Table. Default.
- Specific - Only the RBCs selected from the list are associated to the job or table.

3 Click **OK**.

TIP

For Control-M/Forecast users only:
Using the **Calendars Forecast** and **Table Forecast** buttons, you can graphically display when and how often jobs in the SMART Table will be scheduled for submission based on the defined RBCs criteria.

EXAMPLE

In the SMART Table, create RBCs that will enable some jobs to be scheduled on workdays, others on the first day of each month, and others on the first day of the new quarter.

In the Scheduling tab of the SMART Table editing form, do the following:

1. Click on the **Create local Rule-Based Calendar** button and type **Daily** in the high-lighted row in the RBC name list.
2. In the Month Days area, select **All**; click **And** as the connector; and in the Week Days area, click **Mon**, **Tue**, **Wed**, **Thu**, and **Fri**; in the Months area click **All**.
3. Click on **Create local Rule-Based Calendar** and enter **Monthly**.
4. In the Month Days area, click **1**; in the Months area click **All**.
5. Click on **Create local Rule-Based Calendar** and enter **Quarterly**.
6. In the Month Days area, click **1**; in the Months area click **Jan**, **Apr**, **Jul**, and **Oct**.

Defining dependencies, variables, and notifications in the SMART Table

Fill in the SMART Table parameters as you would for a job, but keep in mind that the SMART table will apply these criteria to all scheduled jobs as a whole.

When defining Shout notifications, be aware that

- in the table editing form, you define Shout notifications in the Shouts tab; but in the job editing form, you define Shout notifications in the PostProc tab
- the format of the Shout statements, and the procedure for defining the Shouts, are the same in both locations

EXAMPLE

A number of jobs belong to a SMART Table which is called CalcsGrp. No jobs in this table should be executed until the BranchSumm job (in a different table) has ended OK. Furthermore, the jobs should not be submitted unless they have Shared control of the BranchSummTots file and exclusive control over the TransUpd file.

Note: This is a z/OS example; the Resources tab is only available for SMART Tables in z/OS.

1. In the Conditions tab of the BranchSumm job processing definition, define the following Out prerequisite condition (to be added): **BranchSumm-EndedOK ODAT +**.
2. In the Conditions tab of CalcGrp, add **BranchSumm-EndedOK ODAT as an** In prerequisite condition.
3. In the Resources tab of CalcGrp, define Shared control over the control resource **BranchSummTots.dat** and exclusive control over the control resource **TransUpd.dat**.

Defining actions to be performed after all scheduled jobs in the SMART Table have ended

Control-M performs post-processing defined in a SMART Table only after all jobs that were ordered in the table have ended or timed out. At this time, Control-M assigns the group of jobs in the table a completion status, and the post-processing actions specified for that group completion status are performed.

- If one or more jobs ended with errors (NOTOK), Control-M assigns the table a status of Not OK.
- If all jobs in the group ended successfully, Control-M assigns the table a status of OK.

If a table is reactivated because jobs in the table were rerun or new jobs were ordered into that table after the group of jobs finished, Control-M re-evaluates the completion status of the table of jobs when the new jobs are completed, and performs post-processing for the table according to the new completion status.

NOTE

If there are no jobs submitted in a table (for example, due to basic scheduling criteria), the completion status of the group is **OK**. Post-processing actions for a table completion status **OK** are performed.

You fill in the post-processing criteria as you would Steps criteria for a job, only instead of filling in a regular **On** statement, you fill in an **On Table-end** statement, which applies the criteria to the results of the SMART Table processing as a whole (for details, see "Defining postprocessing actions that depend on job processing results" on page 114).

1 In the **On Table-end** block, select whether the post-processing actions you will specify should be performed if the processing of the SMART Table ends **OK** or **NOTOK**:

- **OK** — all jobs in the table ended ok.
- **NOTOK** — at least one job in the table ended not OK.

2 In the **On Table-end** block, select the post-processing (Do) actions that Control-M should perform.

3 Repeat the process for another **On Table-end** block if necessary (that is, one block if the table ends **OK** and one block if the table ends **NOTOK**).

EXAMPLE

The salary check-printing job is located in a regular table. It should not be run unless all scheduled jobs in the table containing the SMART Table Payroll ended OK.

In the PostProc tab of the SMART Table Payroll, do the following

1. Click **On/Do** and select **On**; then select type **OK**.
2. Click **On/Do** and select **Do**; then select **Condition**.
3. Define the condition as follows: **Name=PayrollTable-EndedOK Date=ODAT Sign=+**.

(Alternatively, you can specify the condition as an Out condition in the Conditions tab).

Creating and editing Sub-tables

Sub-tables are used for jobs whose processing can be treated as a single unit. They are defined within a SMART table which is referred to as the Sub-table's parent. The Sub-table inherits any RBCs which are defined in the Sub-table's direct parent. The user can select which of these RBCs will affect the Sub-tables submission. A Sub-table can be empty or can contain jobs and other Sub-tables.

The following items should be considered when creating nested Sub-tables:

- The number of nested Sub-table levels within a outermost SMART Table is limited to 9, for a hierarchy limitation totaling 10 including the outermost table.
- Nesting Sub-tables can only be done when working with Control-M Server version 7.0.00 and later.
- The name of a Sub-Table must be unique in its same level of hierarchy, which means that you cannot create a Sub-Table "*X*" under parent table "*a/b/c*" and then create another Sub-Table "*X*" under the same parent table "*a/b/c*".

To create a Sub-table

1 From any Control-M Desktop view:

A Right-click on an existing SMART Table in the hierarchy.

B Select **Add Table to Table** in the displayed menu. The Sub-table editing form is displayed.

From the **Table Manager:**

A Select **Tools => Table Manager** or click in Control-M/Desktop. The Table Manger window is displayed.

B Click an existing SMART Table in the Table list in the window. The Table Content window is displayed.

C Click the **New Sub-table** icon on the Table Content window toolbar to add a Sub-table at this level of the nested hierarchy or click on another SMART Table in the displayed list to open its contents. The Sub-table editing form is displayed.

2 Enter the Sub-table's general definitions in the General tab.

Notice the **Parent Table** field in the **Hierarchy** section of the general tab. This is the name of the SMART Table and any Sub-tables in the Sub-table's hierarchy.

3 In the RBCs area in the Scheduling tab, click on the **Select Rule-Based Calendar** button to open the Select Rule-Based Calendar window. The listed of RBCs are defined for the parent table and can be inherited by the Sub-table. Select from the following options:

— **All Parent**- this option associates all RBCs from the direct SMART Table parent to the Sub-table.

— **Specific** - this option allows you to select from the list of all the RBCs defined in the Sub-table's direct SMART Table parent.

A Sub-table can only select from RBCs which are defined in its direct parent table. A Sub-table cannot define RBCs of its own. By default, a Sub-table is associated with all of its parent table's RBCs. In case a Sub-table is not associated with RBCs, the Sub-table will not be ordered and users must force its submission.

TIP

For Control-M / Forecast users only:
By using the **Table Forecast** button, you can graphically display the plan for the Sub-table according to the RBCs selected. The scheduling plan for the jobs in the table are not displayed.

4 Fill in the Sub-table's parameters as you would for a job. Keep in mind that the Sub-table will apply these criteria to all scheduled jobs as a whole.

5 Click **Save** or **Save & Close**.

Creating and editing jobs in a SMART Table

After you have defined the SMART Table, you can define the table's job processing definitions, using the job editing form.

New jobs can be created within the table by doing the following steps:

1 From any view in the Control-M Desktop, right-click on the table.

2 Select **Add Job to Table** from the drop-down menu. The job editing form is displayed.

3 Define the job's attributes and processing definitions.

NOTE

- In addition to the criteria you define for the SMART Table as a whole, you define individual criteria for the particular job processing definition.
- Most parameters in job processing definitions in a SMART Table are the same as those in job processing definitions in regular tables. For instructions, refer to "Assigning a name to the job" on page 84.
- This section describes details that are unique or different for the job processing definitions in SMART Tables.

Defining scheduling criteria for a job in a SMART Table

When defining scheduling criteria in a job processing definition, you can define individual scheduling criteria and can associate previously defined RBCs with the job.

You can set the relationship between the individual job scheduling criteria and the selected Control-M level RBCs by selecting either **And** or **Or**.

NOTE

When **All** is selected in the **Select Rule-Based Calendar** window for a Sub-table, the RBCs that affect the Sub-table are determined by the Control-M when the Sub-table is submitted. The asterisk wild card "*" will be evaluated only then as well.

Determining whether jobs in a SMART Table will be scheduled

Before jobs in a SMART Table can be scheduled, at least one RBC in the SMART Table must be satisfied (or the job cannot be scheduled). If at least one RBC in the SMART Table is satisfied, job scheduling depends on the following logic (where the relationship between the job scheduling criteria and the selected Control-M level RBCs is determined by selecting either **And** or **Or**):

- If the job's basic scheduling criteria are satisfied, and **Or** is selected, the job is scheduled.
- If the job's basic scheduling criteria are satisfied, **And** is selected, and any of its RBC criteria are satisfied, the job is scheduled.
- If the job's basic scheduling criteria are satisfied, **And** is selected, and none of its RBC criteria are satisfied, the job is not scheduled.

- If the job's basic scheduling criteria are not satisfied, **Or** is selected, and any of its RBC criteria are satisfied, the job is scheduled.
- If the job's basic scheduling criteria are not satisfied, **Or** is selected, and none of its RBC criteria are satisfied, the job is not scheduled.
- If the job's basic scheduling criteria are not satisfied, and **And** is selected, the job is not scheduled.

Table 35 on page 137 summarizes the SMART Table logic. (An ***** in a column indicates that the item has no impact on the scheduling decision for that row.)

Table 35 Determining which jobs in a SMART Table get scheduled

RBC in the SMART Table	Job's basic scheduling criteria	Selected relationship between job scheduling & RBCs	Selected Control-M RBC	Scheduling result
none satisfied	*	*	*	job not scheduled
at least one satisfied	satisfied	Or	*	job scheduled
		And	at least one satisfied	job scheduled
		And	none satisfied	job not scheduled
	not satisfied	Or	at least one satisfied	job scheduled
		Or	none satisfied	job not scheduled
		And	*	job not scheduled

EXAMPLE

Schedule a job in a SMART Table only if the criteria in the **Monthly** RBC are satisfied, and the day of the week is a Monday, Tuesday Wednesday Thursday or Friday.

In the Scheduling tab:

1. In the Week Days area, click **Mon**, **Tue**, **Wed**, **Thu**, and **Fri**.
2. In the RBCs Relationship area, click **and**.
3. Click **Select Rule-Based Calendar** and in the displayed dialog box, select **Monthly**, click the **right arrow**, and click **OK**.

EXAMPLE

Schedule a job in a SMART Table when either the criteria in the **Quarterly** RBC are satisfied, or on any Saturday that is the 15th day of the month.

In the Scheduling tab:

1. In the Month Days area, click **15**.
2. In the Months area, click **All**.
3. Between the Month Days area and the Week Days area, click **And**.
4. In the Week Days area, click **Sat**.
5. In the RBC Relationship area, click **or**.
6. Click **Select Rule-Based Calendar** and in the displayed dialog box, select **Quarterly**, click the **right arrow**, and click **OK**.

Copying RBCs from one SMART Table to another

1 From the Control-M/Desktop window, choose **Edit => Copy Rule-Based Calendars**, which opens the Copy Rule-Based Calendars dialog box.

NOTE

The Copy RBCs option is enabled only when at least two SMART Tables, each containing at least one RBC, exist in Control-M/Desktop.

2 In the Copy Rule-Based Calendars dialog box, do the following:

A In the **From** area of the dialog box, choose the source data center and source SMART Table from which to copy the RBCs, which displays the list of available RBCs in the SMART Table.

B In the **To** area of the dialog box, choose the target data center and target SMART Table to which to copy the RBCs.

C In the **From** area, select the RBCs to be copied and click the right arrow, to add the selected RBCs to the list of RBCs in the **To** area.

3 Click **OK**, to save the current list of RBCs in the **To** area.

Modifying dependencies for jobs within a SMART table

This procedure describes how to modify dependencies for jobs within a SMART table, which ensures that each orderable service is a unique entity, and not dependent on conditions from another service.

NOTE

Note the following:

- You only need to do this procedure if you created services per SMART table, as described in Chapter 24, "Control-M Self Service management."
- If you order a service with jobs that have dependencies, the service runs when the dependency is met. If you order another service that has the same job dependencies as the first, the service runs automatically because it is associated with the job dependency from the first service. This procedure prevents this problem by creating unique service entities that are not associated to other services.

To modify dependencies for jobs within a SMART table:

1 Edit a job with a dependency in a SMART table, as described in "Defining dependencies for the current job" on page 108.

2 For each dependency, add the following suffix:

- Control-M for Distributed Systems
  - <*INCondition*>_%%GROUP_ORDID (*version 6.4.01 and lower*)
  - <*INCondition*>_%%TBALE_ID (*version 7.0.00 and higher*)
- Control-M for z/OS
  - <*INCondition*>_%%GRID (*version 6.4.01 and lower*)
  - <*INCondition*>_%%TBID (*version 7.0.00 and higher*)

Defining job dependencies by using the flow diagram

You can create or redefine job dependencies simply by clicking and dragging between jobs in the flow diagram. (This capability is especially useful after you have used the Mass Create feature to create multiple jobs.) Control-M / Desktop uses a default condition format to automatically define the In and Out conditions needed to create the dependency.

You can modify the default condition format. For details, see "Defining a condition format" on page 141.

NOTE

- To use this feature, you must be working in your local workspace.
- This feature cannot be used to create Do conditions.

To create a job dependency

1 If you are not yet in Definition mode in Control-M / Desktop, click to enter Definition mode.

2 In the flow diagram, click the predecessor job node and drag the mouse to the successor job node.

Control-M / Desktop automatically adds the required Out prerequisite condition to the predecessor job scheduling definition, and In prerequisite conditions to the successor job scheduling definition, and uses In and Out connectors, and dependency lines, to indicate the dependencies in the flow diagram.

TIP

You can customize Control-M / Desktop such that when you create dependencies using this procedure, Control-M / Desktop will automatically create the Out condition needed by the successor job to delete the condition from the Conditions file after the job has successfully run. For details, see the Flowdiagram-Links panel for Control-M / Desktop in Appendix A, "Customizing the interfaces.".

To delete a dependency between jobs

1 Right-click the dependency line of the condition that you want to delete, and in the displayed pop-up menu click **Delete Dependency**.

2 In the Delete Dependency dialog box, select the name of the condition to be deleted and the names of the jobs from which to delete the condition.

3 Click **OK**.

NOTE

In the **Flowdiagram - Links** panel of the Options dialog box, you can customize whether the Delete Dependency dialog box will delete only In Conditions, delete both In and Out Conditions, or prompt for the type of condition to delete. For details, Appendix A, "Customizing the interfaces."

Defining a condition format

You can change the default dependency format used for creating job dependencies when you drag between job nodes in the Control-M/Desktop flow diagram.

Condition format definitions use functions. An example of a condition format is **{MemName}-TO-{ToJob{MemName}}**, which is the default condition format.

To define a Condition Format

1 In the Control-M/Desktop window, choose **Tools => Options** and select the **Flowdiagram => Links** page.

2 In the Condition Format field, select the format for the condition.

3 Click **OK**.

EXAMPLE

Format of the automatically generated conditions should be ***jobname*-ENDED-OK**.

1. In Control-M/Desktop, select **Tools => Options**.
2. In the Options dialog box tree diagram, click **Flowdiagram => Links**.
3. Select **{Job Name}-ENDED-OK**.
4. Click **OK**.

Chapter 5

Organizing and managing jobs in tables

This chapter presents the following topics:

Managing tables 144
Managing jobs in tables. 150

Introduction

You can manage tables and jobs from the

- Control-M/Desktop window (that is, the flow diagram or list display, and the navigation tree)
- Table Manager (and its Table Content window) available in Control-M/Desktop

You can choose either method at any time. Factors that might affect your choice are

- where you are currently working
- whether you want to work in your workspace (use the Control-M/Desktop window) or directly in the Control-M/EM database (choose the Table Manager)
- the task you want to perform

NOTE

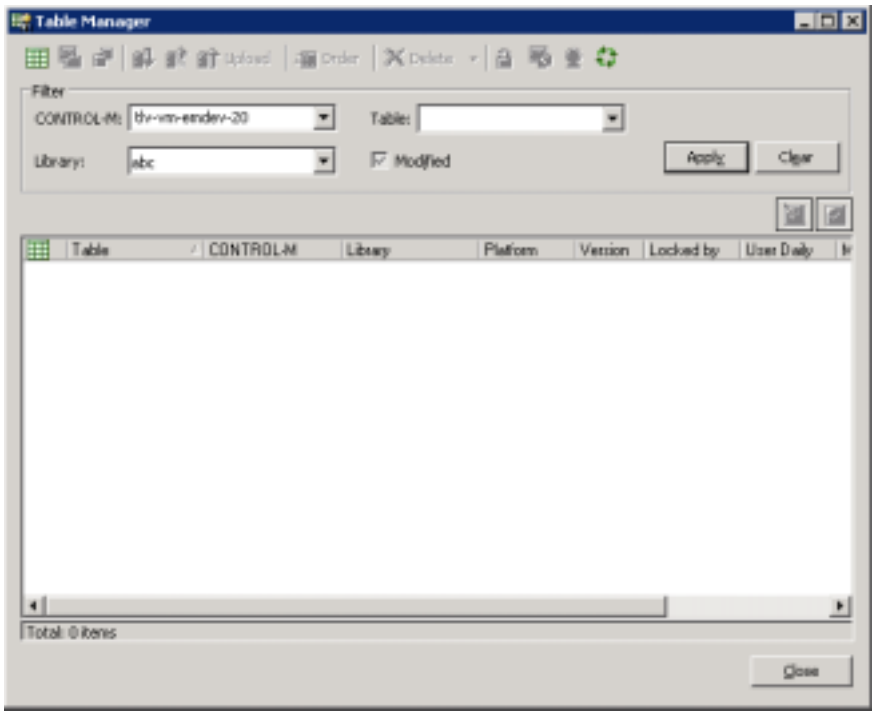
The following tasks are described elsewhere in this book:

- To move jobs and tables to production or to manually schedule jobs, see Chapter 13, "Putting jobs into production."
- If Control-M / Forecast is installed, to generate a schedule forecast for tables (that is, graphically the scheduling criteria of the jobs in the table), see the *Control-M Business Service Management Solution User Guide*.

Managing tables

To display the Table manager, select **Tools => Table Manager** or click in Control-M / Desktop.

Figure 7 Table Manager



The following table describes the filtering fields of the Table Manager.

Table 36 Filter fields – Table Manager

Field	Description
Filter	When selected, this check-box indicates that the filter criteria should be applied.
Control-M	List tables only for the specified Control-M installation.
Table	List the specified tables only.
Library	[For z/OS users] List tables for the specified library only.
Modified	Toggles between display of only Modified (÷) tables, tables that have not been modified (blank), or both (gray).

The following table describes the columns of the Table Manager.

Table 37 Column descriptions – Table Manager

Column	Description
Table	Name of the table (1-20 characters, case sensitive).
Control-M	Name of the Control-M.
Library	[For z/OS users] Name of the library in which the table is located.
Platform	Type of Control-M platform.
Version	Version of Control-M.
Locked by	Name of the Control-M/EM user currently modifying the table. A table can be modified by only one user at a time.
User Daily	Identifier used to assign the table to a specific User Daily Job (1-10 characters, case-sensitive). If "SYSTEM" (uppercase only) is specified, the table is ordered by the New Day procedure. The New Day procedure and User Daily Jobs are described in the *Control-M User Guide*.
Modified	Yes indicates that the table has been updated but not yet uploaded.
Last Upload	Time (24 hour format) of last upload of the table to the Control-M/Server database in the indicated installation.

The following table describes the buttons of the Table Manager.

Table 38 Command buttons – Table Manager

Button	Description
New	Opens the table editing form dialog box to enable definition of a new table. For more information, see "Managing tables" on page 144.
Table Details	Displays a window from which you can modify the selected table. This window is described in "Managing tables" on page 144.
Copy	Opens the Copy Table dialog box to enable the copying of a table. For more information, see "Managing tables" on page 144.

Table 38 Command buttons – Table Manager

Button	Description
Download	Copies the selected table from the Control-M/Server database to the Control-M/EM database. Download is a background process. You can perform other actions during transmission. On completion, the Modified field changes to No. To download a table that is not displayed in the Table Manager window, create the table and then download the table normally.
Force Upload	Copies the selected table to the specified Control-M/Server database, regardless of whether a more recent version of the table exists in the Control-M/Server database. Upload is a background process. you can perform other actions during transmission. On completion, the Modified field changes to No.
Upload	Copies the selected table to the specified Control-M/Server database. Upload is a background process. You can perform other actions during transmission. On completion, the Modified field changes to No. ■ If the table in the Control-M/Server database is a more recent version, a message appears indicating that the Upload is not allowed. This restriction can be overridden using the Force Upload option (described below). ■ To upload or download multiple tables, hold down the <Ctrl> key and select the required tables.
Order	Orders or force the selected table. (SMART Tables can also be ordered from the Order/Force Jobs window in Control-M/EM.) When **Order** is clicked, a dialog box is displayed in which you specify ■ Order date. Specify either **ODAT** or a specific date. ■ Whether to upload the job before ordering ■ Whether to force the job ■ Whether to place the ordered or forced job in Hold status.
Delete (R + L)	Deletes the table from both the Control-M/EM and Control-M/Server databases. For more information, see "Table Synchronization" in the *Control-M User Guide*.
Force Delete (R + L)	Deletes the table from both the Control-M/EM and Control-M/Server databases, regardless of whether a later version of the table exists in the Control-M/Server database.
Local Delete	Deletes the table from the Control-M/EM database only.
Remote Delete	Deletes the table from the Control-M/Server database only.
Table Content	Displays the list of jobs in the selected table, in the Table Content dialog box. This dialog box is described in "Managing tables" on page 144.
Forecast	Provides a scheduling forecast for the selected table (if Control-M/Forecast is installed).
Unlock	Unlocks the selected table to enable modification by a different user.

Table 38 Command buttons – Table Manager

Button	Description
Refresh	Refreshes the status of the tables in the window.
Select All /Unselect All	Selects or unselects all tables displayed in the window.

Table 39 lists table management tasks you can perform with the Table Manager.

Table 39 Table management tasks

Task to perform	How to perform it
to refresh the Table Manager display	Click .
to unlock a locked table	Select the table and click . (You must be authorized.) **Note:** When you select an unlocked table, clicking the (modified) icon locks the table.
to display the list of jobs in a table	Double-click the table name. For additional details, see "To display the list of jobs in a table" on page 151.
to create a table	See "To create a table" on page 147.
to establish a new table as a SMART Table	See "To create a table" on page 147.
to edit a table	Select the table and click (**Table Details**). For additional information, see "To edit a table" on page 148.
to copy a table	Select the table and click (**Copy**). For additional details, see "To copy a table" on page 149.
to delete tables	Select the table(s), click the selection arrow by the **Delete** button, and choose the appropriate Delete option. For additional details, see "To delete tables" on page 149.

To create a table

TIP

You do not need to explicitly create tables without SMART attributes for jobs. When you specify a table name in the job editing form, if the table does not already exist, Control-M / Desktop automatically creates it. You can define SMART attributes for the table by editing it manually. For more information see "To edit a table" on page 148.

1 In the Table Manager window, click (**New**), which opens the table editing form dialog box.

2 Fill in the details for the new table in the various fields. Fields marked with an asterisk are mandatory.

3 Fill in the **User daily** field as follows, but only if one of the following applies:

- If the table should be ordered by a specific User Daily job, specify the name of the job (1-10 characters, case sensitive).
- If the table should be ordered by the New Day procedure, specify **SYSTEM** (uppercase only) as the value.

The New Day procedure and User Daily Jobs are described briefly in Chapter 14, "Automating job scheduling and maintenance," and in detail in the *Control-M Administrator Guide*.

NOTE

If you are defining a z/OS table, any value you specify in the User daily field is for documentation purposes only. To actually assign the table to the New Day procedure or to a specific User Daily job, follow the instructions in the *Control-M for z/OS User Guide*.

4 Click **Save** or **Save & Close**, which saves the table in the Control-M/EM database (and displays the name in the Table Manager window).

To use the table, you must perform an upload. For instructions, see "Uploading tables to the Control-M database" on page 196.

To edit a table

1 In the Table Manager, select the table and click (**Table Details**).

2 In the table editing form, make the changes and click **Save** or **Save & Close** (you must be authorized), which saves the changes in the Control-M/EM database.

NOTE

You can change a table to a SMART Table in the table editing form by selecting the SMART Table checkbox and defining the extended scheduling parameters.

To apply the changes to the table definition in the Control-M database, you must perform an upload. For instructions, see "Uploading tables to the Control-M database" on page 196.

WARNING

- If you modify a table associated with more than one User Daily and then upload it to Control-M, that table is removed from all User Dailies except the one it is associated with in Control-M/EM.
- To modify the extended set of table parameters for a SMART Table, you must do so in the Scheduling tab of the table editing form. For instructions, see "Defining scheduling criteria for a job—basics" on page 88.

To copy a table

1 In the Table Manager, select the table to be copied, and click (**Copy**).

2 In the **Copy Table** dialog box, specify a name for the new table in the **Name** field, modify the other criteria as needed, and click **Save** or **Save & Close**, which saves the table in the Control-M/EM database.

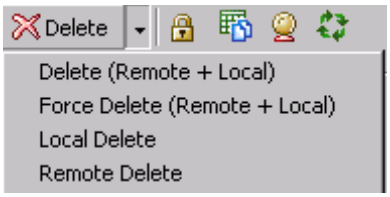
NOTE

If you specify a different target Control-M, it must have the same platform and version as the original table's Control-M.

To use the table, you must perform an upload. For instructions, see "Uploading tables to the Control-M database" on page 196.

To delete tables

In the Table Manager, select the table, click the selection arrow by the **Delete** button, and then choose the appropriate Delete option, as follows:



- To delete the tables from both the Control-M/EM database and the Control-M database, click **Delete (R + L)**. (This option is the default if you click **Delete** without selecting a **Delete** option.)
- If the deletion fails, click **Force Delete (R + L)**, which can often successfully perform a deletion in a non-serious error situation.
- To delete the tables from the Control-M/EM database only, click **Local Delete.**
- To delete the tables from the Control-M database only, click **Remote Delete**.

Managing jobs in tables

You can perform many job management tasks in the job editing form, Tree view, Flow diagram and the Table Content dialog box. Table 40 lists common job management tasks.

Table 40 Job management tasks

Task to perform	How to perform it
display the list of jobs and Sub-tables in the Table Content dialog box	Double-click the table name in the Table Manager. For additional details, see "To display the list of jobs in a table" on page 151.
edit the details of a job or Sub-table	Select the job or Sub-table from any view of the Table Content dialog and click **Edit**; alternatively, for jobs only (not Sub-tables), in the flow diagram, double-click the job's node. For additional details, see "To display the details of a job or SMART Table" on page 152.
move a job	Either redefine the relevant parameter (for example, Control-M) in the job editing form, or in the tree view drag the job to its new location in the navigation tree. For additional details, see "To move a job to a different Control-M, table, application, or group" on page 153.
delete jobs from a table	In the flow diagram, navigation tree, list display, or Table Content dialog box, select the jobs, and click **Delete**. For additional details, see "To delete jobs from a table" on page 153.
browse a job	In the flow diagram, navigation tree, list display, or Table Content dialog box, select the jobs, and click **Browse.**
copy a job	In the Flow Diagram, select the source job, and choose **Edit => Copy Job**. A copy of the job, with a unique identification number, is added to the Flow Diagram. **Note:** This feature is only available in your local workspace.
to display the list of versions of a job	Select the job in the list and click (**Show History**). From the Job History window you can manage the versions of the deleted jobs as follows: ■ viewing the job properties ■ comparing versions ■ restoring previous versions of jobs ■ restoring and editing jobs See "Exploring versions of definition entities" on page 157 for a description of the job history dialog box.

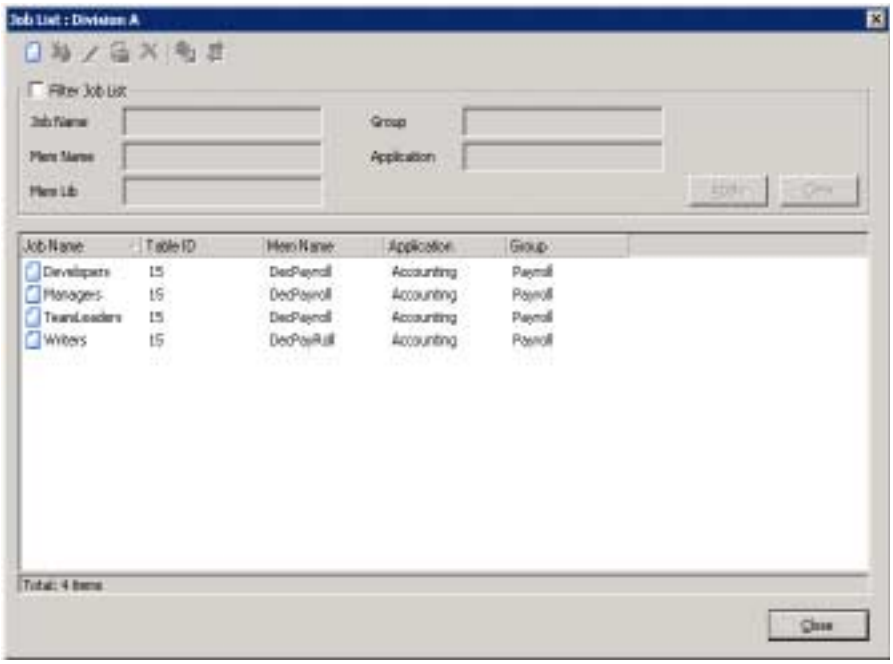
To display the list of jobs in a table

1 Display the Table Manager by choosing **Tools => Table Manager** in Control-M / Desktop.

2 In the Table Manager, double-click the table name. The Table Content dialog box is displayed with a list of jobs in the selected table.

SMART Tables may contain Sub-tables which will also be displayed in the list of jobs. The contents of a Sub-table can be viewed by clicking on the Sub-table in the list.

Figure 8 Table Content dialog box



The columns in the Table Content dialog box display job definition parameters. For parameter descriptions, see the *Control-M Parameter Guide*.

3 To filter the list of jobs, click the Filter List check-box, specify values in the fields at the top of the Table Content dialog box, and click **Apply**. (To remove filter criteria from the fields, click **Clear**.)

The following table describes the filtering fields of the Table Content dialog box.

Table 41 Filter fields – Table Content dialog box

Field	Description
Job Name	Name of the job.
Mem Name	Name of a file containing a job script.

Table 41 Filter fields – Table Content dialog box

Field	Description
Mem Lib	Name of a library / directory in which a job script is located.
Group	Name of a group of jobs.
Application	Name of an application. Used to supply a descriptive name to a set of related groups of jobs.

The following table describes the buttons of the Table Content dialog box.

Table 42 Command buttons – Table Content dialog box

Element	Description
Clear	Clears filter criteria from the filter fields.
Apply	Applies the specified filter.
New	Opens a new job editing form (for an undefined job). It can also create a table if the table defined in the Table field does not exist. Unavailable if the table is locked or if the user is not authorized to open a job in the table.
Update (View)	Displays the currently selected job in the job editing form for update. (If the table is currently locked, or the user is not authorized to update the table or its jobs, the button says **View**, and opens the job for viewing only.)
Delete	Deletes the currently selected job definition or table. Unavailable if the table is locked or the user is not authorized to delete the table or its jobs.

NOTE

- If updates are not permitted (for example, the table is locked or you do not have authorization), the phrase **[Read Only]** appears in the title bar.
- Pattern-matching special characters can be used for filtering. For details, see "Pattern-matching strings" on page 387.
- The filter fields and the columns in the Table Content dialog box represent job definition parameters. For parameter descriptions, see the *Control-M Parameter Guide*.

To display the details of a job or SMART Table

Do one of the following actions:

- If you are working in the Table Manager, select the job in the Table Content dialog box and click **Edit**. (If the Table Content dialog box is not already displayed for the table, display it by double-clicking the table that contains the job whose definition you want to display.)
- If you are working in the Control-M / Desktop window (for jobs only, not for tables), double-click the job's node in the flow diagram or navigation tree.

The job or table editing form opens. For instructions on filling in the job or table editing form, see "Creating and editing jobs" on page 83.

NOTE

If the job processing definition cannot be updated (for example, the table is locked or you do not have authorization), the Table Content dialog box contains a **Browse** button instead of an **Edit** button.

To move a job to a different Control-M, table, application, or group

Perform one of the following actions:

- In the job editing form for the job, redefine the relevant parameter (for example, Control-M).
- In Control-M / Desktop, display the appropriate hierarchy, and in the navigation tree, drag the job to the new location.

To delete jobs from a table

In the flow diagram, navigation tree, list display, or Table Content window, select the jobs and click **Delete**.

NOTE

- Deleting a job deletes it from the draft or XML file, and therefore from any Control-M / Desktop panes in which it is displayed.
- The job will be deleted from the database when you write the table back to the Control-M / EM database.
- If you delete a table, all jobs in the table are deleted automatically. If a table is locked for editing in the local workspace and is then deleted, it will be unlocked.
- If you delete a job from the flow diagram, to avoid cutting the connection between the deleted job's predecessor and successor jobs, set the appropriate option in the Flowdiagram - Links panel.

  Important: This option works only when you are deleting a job from the flow diagram in a Local workspace, and only if you delete one job at a time. For details, see the description of the customization option "Automatically inherit job's conditions if deleted" on page 355.

Chapter 6

Comparing jobs

This chapter presents the following topics:

Introduction 155
Comparing jobs 155

Introduction

You can compare different jobs from the

- Control-M/Desktop window (that is, the flow diagram or list display, and the navigation tree)
- Table Content window available from the Table manager in Control-M/Desktop

You can choose either method at any time. Factors that might affect your choice are

- where you are currently working
- whether you want to work in your workspace (use the Control-M/Desktop window) or directly in the Control-M/EM database (choose the Table Manager)

Comparing jobs

The Job Comparison window enables you to compare jobs and generate comparison reports. Table 43 lists common job comparison tasks.

To display a list of differences between two jobs

1 Select two jobs in Control-M / Desktop.

2 Choose **Actions => Compare**.

The Job Comparison window opens (see Figure 9). The tasks that can be performed with Job Comparison window are described in Table 43.

Figure 9 Job Comparison dialog box

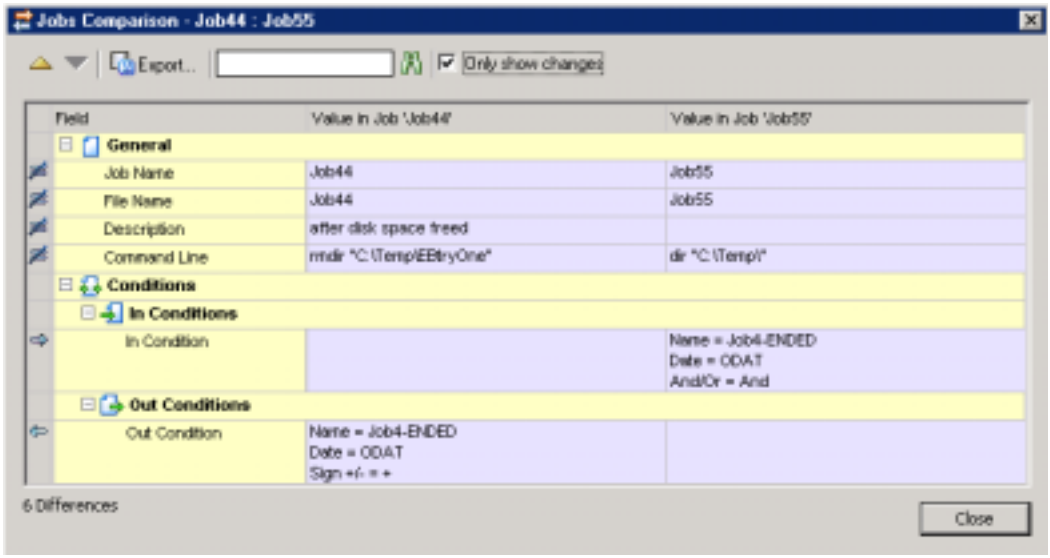


Table 43 Job comparison tasks

Task to perform	How to perform it
to navigate to rows describing differences	Click on the Previous Difference or Next Difference arrows icons.
to export a report describing the differences between the two job versions	Click (**Export**). Select the destination folder and the type of document (HTML, text, or XML) for the report.
to search for a string in the field values	Type in the string and click (**Find Next**).
to display only the rows that contain differences between the jobs	Select **Only show changes**.

Chapter 7

Exploring and tracking versions of definition entities

This chapter presents the following topics:

Exploring versions of definition entities. 157
Version Manager window 158
Viewing a job's history 160

Introduction

You can explore versions of items from Control-M/Desktop tree view, Table Content and flow diagram, as well as the Version Manager window and the Table Content window from the Table Manager.

Depending on where you are working may determine which method is best for you. The Control-M/Desktop Version Manager only directly affects the local workspace, whereas operations that are performed through the Table Manager and online workspace immediately affect the Product Short database.

Exploring versions of definition entities

This section describes how to explore definition entity versions using the Version Manager and Job History windows.

Version Manager window

In the Version Manager window, you can view job and table definitions for a specified date and time that corresponds to your specified filter criteria. A list of the matched definitions appear, indicating the changes made to the item since the specified date and time.

Each definition entity can be reviewed from the job or table editing form and then selected for a restore operation. Multiple entities can be selected when performing the restore operation.

NOTE

A restore action can only be applied in a local workspace and does not affect the database until a write action is performed.

To display a list of item versions on a specific date and time using a filter criteria

1 Select **Tools => Version Manager** in Control-M / Desktop.

2 In the top of the window, specify the date and time changes were made to the version, since the specified date and time you want listed. Jobs and tables which meet the specified criteria will be displayed with any indication of change compared to the entity's present status.

3 To limit the scope of the job and tables listed by using a filter criteria, define values for the following definitions:

- Control-M - all tables and jobs for this Control-M
- Table - the table and its list of jobs
- additional information - click **Additional** to define additional filter criteria

NOTE

In addition to the filter criteria defined in Step 3, you can use the **Change Type** buttons to further limit the scope of the filter. All items which match the filter criteria and the selected change type are listed. **Change Type** buttons include:

- **Unchanged items** - items which have not changed since the specified date
- **Modified items** - items which have been modified since the specified date**,** including modifications which would affect the items inclusion or removal from the filtered list
- **New items -** items which have been created since the specified date**,** including items which may have been created after the specified date and later modified or deleted
- **Deleted items -** items which have been deleted since the specified date

4 Click **Apply**. A list of definition entities appears.

Review or restore items in the filtered list by performing one of the tasks described in Table 44.

Table 44 Version Manager management tasks

Task to perform	How to perform it
to view the properties of a definition entity	Double-click the selected definition entity in the list or click the **Properties** button. **Note:** You cannot edit the definition entity from this view.
to display the list of versions of a definition entity	Select the definition entity in the list and click **Show History**. From the Job History window you can manage the versions of the definition entities as follows: ■ viewing the definition entity properties ■ comparing versions ■ restoring definition entities ■ editing and restoring definition entities For more information, see "Exploring versions of definition entities" on page 157.
to restore one or more entities	Select one or more definition entities in the list and click **Restore**. **Note:** Definition Entities are only restored locally in the Control-M/Desktop. You must then write the table containing the job or Sub-table to the Control-M/EM database in order to restore it in the database.
to edit and restore a definition entity version	Select the definition entity in the list and click **Edit & Restore**. The job or table editing form opens so that you can edit and restore its version.
to export the list of definition entities	Right-click in the list area and click **Export to File**. The list is saved as a **.csv** file.
to print the list of definition entities	Right-click in the list area and click **Print**.
to display the number of definition entities in the list	Right-click in the list area and select **Item Count**. The number of definition entities in the list is displayed in the status area below the horizontal scroll bar.
to compare currently monitored version of a definition entity with its current active version	Select a definition entity and click **Compare to current.** The Versions Comparisons dialog box is displayed side by side.

Viewing a job's history

The Job History dialog box enables you to view previous versions of the selected job that were written to (saved in) the Definition file in the Control-M/EM database. Table 45 lists common job version management tasks.

To display the list of versions of a job

1 Select a job in Control-M/Desktop.

2 Choose **Actions => Show History**.

The Job History dialog box opens. The tasks that can be performed with Job History dialog box are described in Table 45.

Table 45 Job version management tasks (Part 1 of 2)

Task to perform	How to perform it
to display the details of a job version	Select a job version in the list and click **Properties**. The job or table editing form opens. **Note:** The details cannot be edited from this view.
compare two versions of a job	In the Job History dialog box, select two job versions, and click **Compare**. The differences between the versions are marked with an icon and rows are highlighted. **Tip:** While the Version Comparison window is open, you can select any of the available versions for comparison, without closing and reopening the Version Comparison window. Click either one of **Down Arrow** icons, located at the right top corners of the **Value in Version X** columns, and select a version from the menu.
to replace a current job with a previous version of the job	Select required previous version in the list and click **Restore**. **Note:** If you are working in the Online workspace or in the Table Content dialog box from the Table Manager, the job is restored in the Control-M/EM database. If you are working in the Local workspace, the job is only restored locally in the Control-M/Desktop. You must then write the table containing the job to the Control-M/EM database in order to restore it in the database.

Table 45 Job version management tasks (Part 2 of 2)

Task to perform	How to perform it
to edit a previous version of the job and replace the current job with the edited version	Select the job in the list and click **Edit & Restore**. The job editing form opens so that you can edit the previous version and replace the current version with the edited version.
to refresh the job versions list	Click .
to export the list of job versions	Right-click in the list area and click **Export to File**. The list is saved as a **.csv** file.
to print the list of job versions	Right-click in the list area and click **Print**.
to display the number of job versions in the list	Right-click in the list area and select **Item Count**. The number of job versions in the list is displayed in the status area below the horizontal scroll bar.

Chapter 8

Using predefined calendars to schedule jobs

This section presents the following topics:

Creating and modifying calendars 165
To define Regular and Relative calendars 165
To define Periodic calendars 166
To define Rule-Based calendars 167
Managing calendars. 168
Uploading and downloading calendars. 168
Copying calendars. 169
Deleting calendars 169
Refreshing and unlocking calendars 170
. 170

Introduction

You can define and use calendars to simplify how you define job scheduling criteria. Calendars enable you to define a set of scheduling criteria once in a calendar definition and then apply those criteria to job schedules by specifying the calendar name in the job processing definitions. This feature saves you from having to define those sets of criteria individually in each job.

You create, modify, and manage calendars by using the Calendar Manager dialog box, which you access from Control-M/Desktop. This dialog box accesses the Control-M/EM database. Before a calendar can be used for scheduling, it must also be uploaded to the appropriate Control-M/Server database.

The Calendar definition facility supports the following types of calendars:

- Regular calendars, which use dates as they appear in regular calendars.
- Periodic calendars, which divide the year into working periods instead of the standard twelve months. Periods can be nonconsecutive, of varying length, and overlapping. No single period can exceed 255 days.
- Relative calendars (Control-M for z/OS only), which provide alternate scheduling dates for situations where the specified dates are not scheduled in a calendar. In a Relative calendar, the specified date has + or - to indicate that if the marked date is scheduled, schedule it in the calendar. If the marekd date is not scheduled, schedule the closest next date (+) or the closest previous date (-).
  You can use Relative calendars to combine calendars through the Control-M IOABLCAL utility. For details, see the *Control-M for z/OS User Guide*.
- Rule-based calendars, which are specified with rules, independent of specific years. These calendars can apply to scheduling over several years since they do not have to be redefined for each year. There are two types of Rule-based calendars: table level (local) and Control-M level. Table level rule-based calendars can be created in a SMART Table and apply to that table and all its children tables. Control-M level Rule-based calendars can be created with the Calendar Manager and applied to any job or SMART Table that is connected to the specific Control-M on which the Rule-based calendar was defined.

Each calendar you create is defined for a specific year (except Rule-based calendars) and on a specific Control-M, but you can copy calendar definitions to other years and to other Control-Ms.

To see the effect of a calendar on a job's schedule plan, use Control-M/Forecast. For details, see Chapter 19, "Planning production with Control-M/Forecast."(If Control-M/Forecast is not licensed at your site, you can use the CTMRPLN utility to produce a report that indicates when jobs in a selected calendar are scheduled to run. For more information, see the *Control-M Administrator Guide* and the *Control-M for z/OS User Manual*.)

Creating and modifying calendars

1 In Control-M/Desktop, display the Calendar Manager by choosing **Tools => Calendar Manager** or by clicking , which opens the **Calendar Manager** dialog box to display the list of calendars that exist in the Control-M/EM database.

2 To modify an existing calendar, select the calendar in the **Calendar Manager** dialog box, and click (**Edit**). To create a new calendar, do the following:

A In the Calendar Manager dialog box, click (**New**).

B In the displayed **Calendar** dialog box, select the Control-M in which the calendar will be defined, enter a name for the calendar, and select the type of calendar (Regular/Relative, Periodic, or Rule-based).

3 Continue with one of the following procedures, depending on your choice in step B:

- To define Regular and Relative calendars
- To define Periodic calendars
- To define Rule-Based calendars

To define Regular and Relative calendars

1 (Optional) Fill in a free text description that will appear in the Calendar Manager.

2 Define the year for the calendar by doing one of the following:

- Use the year that is displayed.
- Select a different year.
- Define a different year that is not listed. Click **New** and select a year from the **New Year** dialog box and click **OK**.

3 Select the required days or use the following short cuts:

- To select multiple days, select a date and drag over the required days.
- To clear currently selected dates, click the appropriate date.
- To apply the same set of dates to all the months:

A. Click **Advanced.**

B. In the displayed **Advanced Dates Selection** dialog box, select the dates by clicking any combination of specific dates, column and row headers, and days of the week.

C. Click **OK**.

4 In Control-M for z/OS only, if a date in the calendar is not scheduled, schedule the closest scheduled date in the calendar instead:

- Right-click the date and select + to schedule the date if it is scheduled, or the closest next date, if it is not scheduled.
- Right-click the date and select - to schedule the date if it is scheduled, or the closest previous date, if it is not scheduled.
- To clear the +/- on a date, right-click a date, and select the blank.

5 To add an additional year to the calendar, with the same settings, click **Copy**. In the New Year dialog box select the additional year and click **OK**.

6 When you have finished defining the calendar, click **Apply** to save the calendar changes in the Control-M/EM database.

To use the calendar, you must perform an upload.

To define Periodic calendars

1 Perform step 1 and step 2 in the procedure for defining Regular and Relative calendars.

2 In the Periods toolbar, identify the period:

- Select the identifier from the list.
- For Control-M for z/OS only, in the text box, enter a special character. Only valid characters can be entered.

3 Select the dates for which you want to provide the same period identifier or use the short cuts described in step 3 in the procedure for defining Regular and Relative calendars.

4 Continue with step 5 to the end of the procedure for defining Regular and Relative calendars.

To define Rule-Based calendars

1 Specify the scheduling criteria for Rule-Based calendar in the **Rule Based Calendar Definition** dialog box.

Since the use inferface is like the one used for defining scheduling criteria for jobs and SMART Tables, for more details see "Defining scheduling criteria for a job—basics" on page 88 and "Defining scheduling criteria for a SMART Table" on page 129.

2 Click **OK**.

EXAMPLE

To schedule a job on each Wednesday in March, in the calendar for March, do the following:

1. Select the first Wednesday of the month, and drag over the other Wednesdays in the month.
2. Click **Save**.

EXAMPLE

To schedule a job on each Tuesday in every month, do the following:

1. Click **Advanced**.
2. In the **Advanced Dates Selection** dialog box, click the **Tue** check-box, and then click **OK**.
3. Click **Save**.

EXAMPLE

To schedule a job on first and fifteenth day in every month except April, do the following:

1. Click **Advanced**.
2. In the **Advanced Dates Selection** dialog box, click calendar days **1** and **15**, and then click **OK**.
3. In the calendar, in April, click (off) calendar days **1** and **15**.
4. Click **Save**.

Managing calendars

This section describes how to upload and download calendars, how to copy or delete them, and several other calendar management tasks.

Uploading and downloading calendars

NOTE

Upload and download are background processes; during these processes, you can perform other actions.

You must upload calendars from the Control-M/EM database to the Control-M/Server database, to use them for job scheduling,

To upload updated calendars to the Control-M/Server database

In the Calendar Manager dialog box, select the calendar, and click

.

TIP

If the Control-M/Server database contains a more recent version of the calendar you are trying to upload, an "Already Updated" error is issued and the upload is prevented. To force the upload in this case, click (**Force Upload**).

To download calendars from the Control-M/Server database to the Control-M/EM database

In the Calendar Manager dialog box, select the calendar, and click (**Download**).

TIP

To download a calendar that is not displayed in the Calendar Manager dialog box, create an empty calendar with the same name and save it; then download the calendar normally. (The downloaded version will overwrite the empty version.)

Copying calendars

Instead of creating new calendars from beginning to end, you can copy and modify existing calendars. Although calendars are defined on a particular Control-M, you can copy them to other Control-Ms.

NOTE

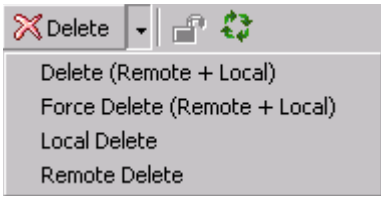
When copying a calendar, if you specify a different target Control-M, it must be the same platform and version as the source calendar's Control-M.

To copy a calendar

1. In the Calendar Manager dialog box, select the calendar and click (**Copy**).
2. In the displayed Copy Calendar dialog box, select the Control-M to which the calendar will be copied, and enter a name for the new copy of the calendar.
3. Click **OK**, which saves the copy of the calendar in the Control-M/EM database, and displays the new calendar name in the Calendar Manager.

Deleting calendars

In the Calendar Manager dialog box, select the calendars and click the appropriate button option, as follows:



- To delete the calendars from both the Control-M/EM database and the Control-M/Server database, click the **Delete** button or click **Delete (R + L)**. (This is the default if you click **Delete** without selecting a **Delete** option.)
- If the delete fails, click **Force Delete (R + L)**, which can often successfully perform a delete in a non-serious error situation.
- To delete the calendars from the Control-M/Server database only, click **Remote Delete.**
- To delete the calendars from the Control-M/EM database only, click **Local Delete.**

Refreshing and unlocking calendars

If you have the required permissions, you can also refresh the calendar display, and unlock locked calendars. (Calendars are locked automatically while they are being edited, and you should exercise great caution before unlocking them. For example, you might need to unlock a calendar that was being edited when a crash occurred.)

To refresh or unlock calendars

In the Calendar Manager, click (**Refresh**).

To unlock calendars

In the Calendar Manager, select the calendars and click (**Unlock**).

Chapter 9

Setting up templates for standardized job and table definition

This chapter presents the following topics:

Defining templates 172
Adding functions to template fields 174
Managing templates 175

Different jobs will often have the same values for many parameters. To make the process of defining such jobs easier, you can define the common values in a template, and use the template to place those values into the job processing definitions. Templates can be useful whether you are creating job processing definitions one at a time or creating large numbers of job processing definitions, all at the same time.

You can also define SMART Table templates. SMART Table templates can be used not only for creating SMART Tables, but for defining jobs within the SMART Table as well by applying the SMART Table template on a specific job or table.

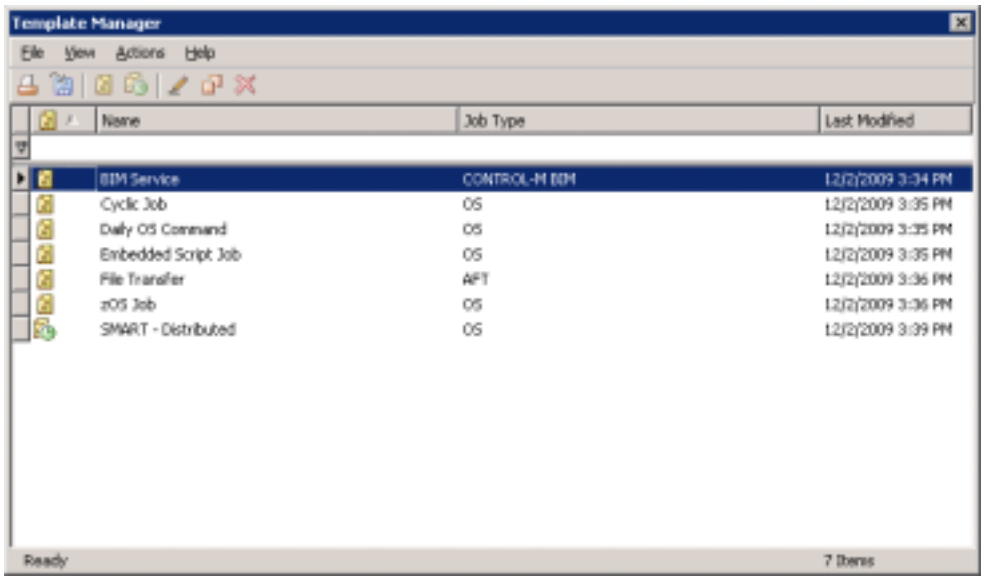
You can also define Rule-Based Calendars for templates.

Templates are platform-specific. The product comes with sample job and SMART Table templates for supported platforms, which you can use as a basis for developing your own templates.

Defining templates

1 In the Control-M/Desktop window, choose **Tools => Template Manager**, which displays the Template Manager.

Figure 10 Template Manager



2 In the Template Manager, do one of the following to display the template editing form, which is similar to a job or table editing form:

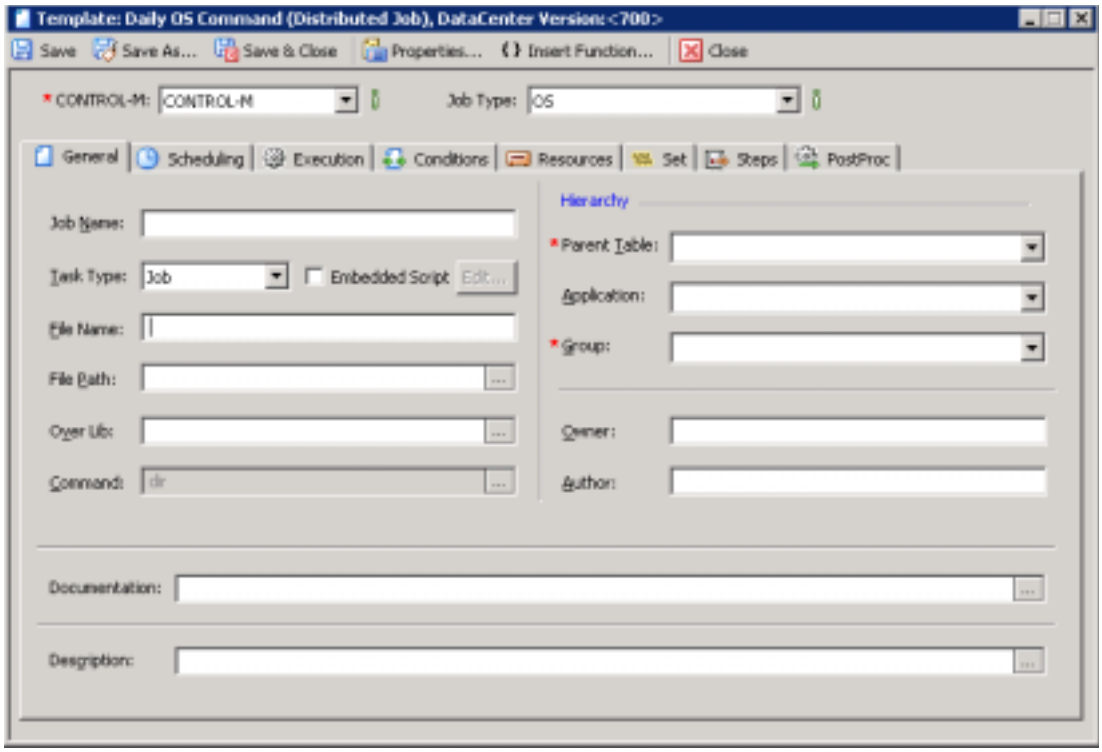
- Select the template in the list of templates and click (**Update Template**) to modify an existing template, or create a new template from an existing template.
- To create an all new template from beginning to end:

  — Click the **Add Job Template** icon on the toolbar to create a template for a regular job.

  — Click the **Add SMART Table Template** on the toolbar to create a template for a SMART Table.

  The Template job editing form or table editing form is displayed. The following figure shows the Template job editing form.

Figure 11 Template job editing form



3 Fill in or modify the template. For instruction and hints, see the instructions for filling in the job editing form in "Creating and editing jobs" on page 83. (For a description of the parameters of in Job Editing Form, and their usage and values, see the *Control-M Parameter Guide*.)

In most free text fields (exceptions include **Control Resource Name**, **Quantitative Resource Name**, **AutoEdit var**, and **Steps**, which are located in the appropriate tabs), you can insert predefined functions instead of, or in addition to, literal values. (For example, in the **Job Name** field, you might insert the function **jbl{counter}**). For instructions on inserting functions, see "Adding functions to template fields" on page 174.

4 When you have finished defining the template, save it by clicking **Save**, **Save As**, or **Save and Close** at the top of the template.

Adding functions to template fields

When defining values in template fields, you can add functions that get resolved when the template is used to create job processing definitions. For example, when using a template to create many jobs beginning with the same name, you can add a counter function after the name prefix in the template's **Job Name** field, to ensure that each job is created with a unique name.

To insert functions into a field

1 Place the cursor in the field and click **Insert Function** on the toolbar at the top of the template.

2 In the Insert Function dialog box, click **Insert Function**.

3 In the displayed list, perform one of the following actions (to perform several of the following actions, select just one and perform it, and then continue with the remaining steps, which will have you cycle through this step again):

- To use the value from another field
  - select **{Field Name**}
  - in the displayed **From source** list, select the field whose value should be used in the field.
- To insert a counter
  - select **{Counter}**
- To insert a substring
  - select **{Substr}**
  - in the displayed **From source** list, select the source from which the substring should be taken
  - select the number of characters that should be taken from the source for the substring, and the character position from which to begin taking the substring extract

- To add or subtract a value to a numeric function
  - — select **{+}** or **{-}**
  - — select the source of the value
  - — select the quantity to be added or subtracted

4 If a green check-mark is displayed to the right of the Insert Function dialog box, click it.

5 To add more functions, repeat the process beginning with Step 2.

6 To add a literal value before or after the function, position the cursor in the correct position and specify the value.

7 When finished, click **OK** in the Insert Function dialog box.

TIP

If you clicked **OK** in the Insert Function dialog box, and functions you selected did not appear, you might have forgotten to click the green check-mark. Specify each missing function again and ensure you click the green check-mark. Then click **OK** again.

For a list description of available functions, see Table 83 on page 391.

EXAMPLE

The template should add the following values to jobs (along with other values not included in the example):

- a job name of APXY*n*, where *n* is incremented by 1
- a file name of *jobname*.bat

In the following template fields, define the following indicated values and functions:

- In the **Job Name** field: **APXY{Counter}**
- In the **File Name** field: **{Job Name}.bat**

Managing templates

This section explains how to copy and delete templates.

To copy a template locally

1 In the Template Manager, select the template to be copied and click (**Copy Template**).

2 Enter a new name for the template, and click **OK**.

To copy a template to another computer

Templates are stored as .xml files under **<*InstallationDirectory*>\Data\Templates**. You can transfer them to any computer that has the same operating system and version.

To delete a template

In the Template Manager, select the template and click (**Delete Template**).

Chapter 10

Creating and updating many jobs at once

This chapter presents the following topics:

Introduction 177
Creating large numbers of jobs 177
Finding and updating many entities at once 178
    Finding and updating jobs and tables 179
    Managing updated jobs 184

Introduction

Through the Mass Create feature of Control-M / Desktop, you can automatically create large numbers of job processing definitions through a single request.

Although you must later provide these jobs their unique values individually in the Job Editing form, this technique saves you from having to enter the common values for these jobs individually.

You can use the Find and Update feature of Control-M / Desktop to perform updates on large numbers of existing job processing definitions.

Creating large numbers of jobs

This section describes how to use the Mass Create feature to create large numbers of jobs with similar parameters.

To create multiple jobs with similar parameters

NOTE

To use the Mass Create feature, you must be working in your local workspace.

1 In the Control-M/Desktop window, choose **Tools => Mass Create** or click .

2 In the Mass Create dialog box, choose the number of jobs to create and select the template to be used for creating the new job processing definitions. (To create a new template or edit an existing template, click **Edit Template**. For details about editing templates, see Chapter 9, "Setting up templates for standardized job and table definition.")

TIP

Instead of creating all jobs in a table with a single request, you can use several requests and modify the template before each request. The resulting jobs might then require less cleanup after you have created them.

3 Click **OK**.

4 After you have performed mass job creation, you can create dependencies between the jobs by clicking and dragging on job nodes in the flow diagram.

Finding and updating many entities at once

The Control-M/Desktop Find and Update feature can find jobs and update fields and values in jobs and tables.

Using the Find and Update feature, you can:

- search for job processing definitions tables with various values in any field, including application form fields and list fields such as On/Do statements
- update, add, or remove any of the job processing definition and table fields

NOTE

The Update button is only enabled when working in a Local workspace and can not be used for Online workspaces and Forecast workspaces.

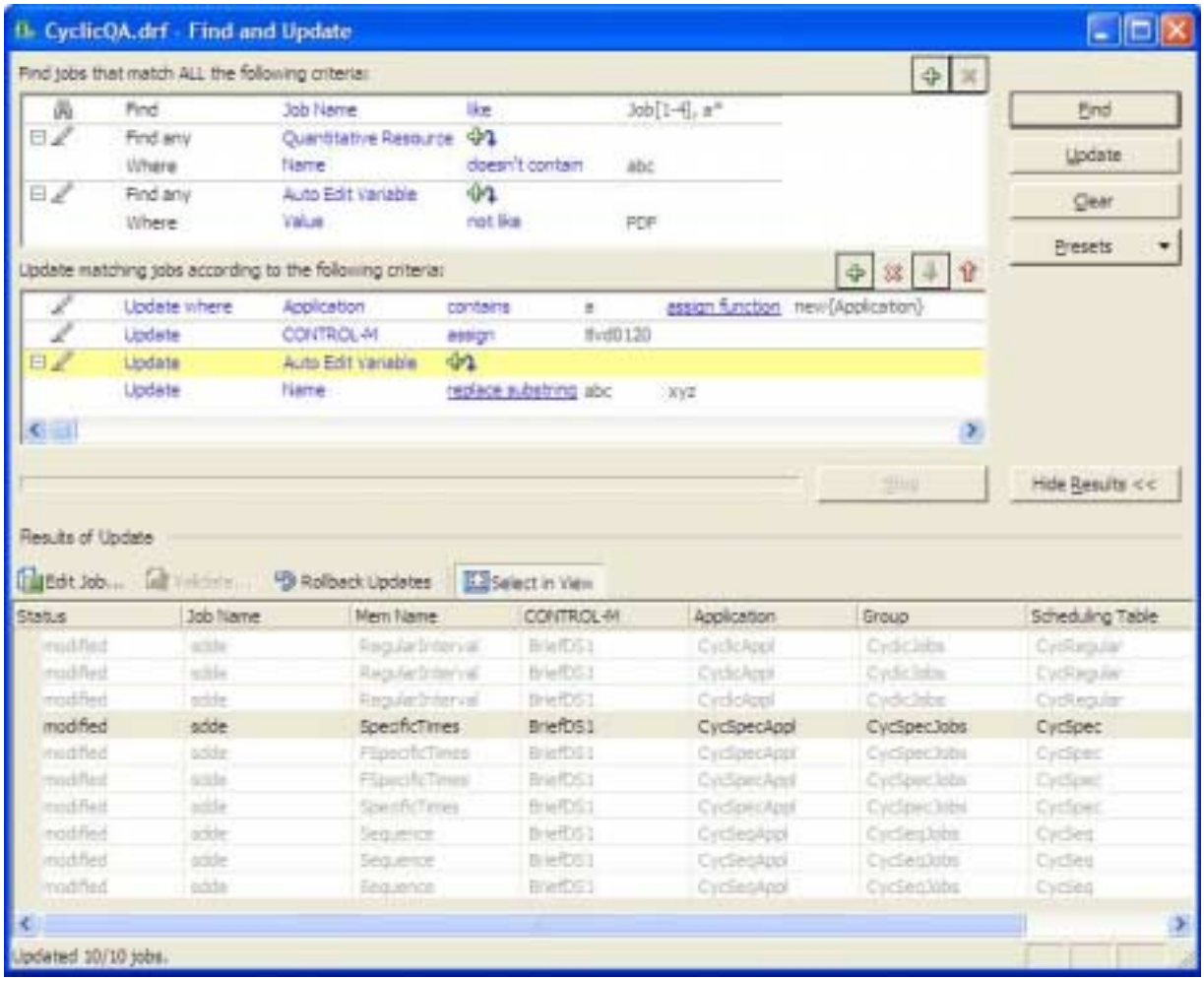
In Forecast workspaces, conducting a search is limited to certain fields, because only part of the job is loaded from the Forecast Server.

Finding and updating jobs and tables

To find and update jobs and tables

1 In Control-M/Desktop, choose **Edit => Find and Update**.

Figure 12 Find and Update window



2 In the Find grid area of the Find and Update window, choose or fill in the following information:

- field in the job or table processing definition to be searched and possibly updated
- an operator
- a search value

NOTE

When supported application forms are installed, applications fields can be selected from the Forms submenu. You must restart Control-M / Desktop after installing an application panel.

3 To add additional search criteria expressions, click or **Insert**, and repeat step 2 for each expression. An **AND** relationship applies to multiple criteria expressions; a job must satisfy all specified criteria to match. To delete search criteria expressions, select the expression and click or **Delete**.

4 To save the specified Find and Update criteria for future use, choose **Presets => Save** and specify a name in the Save Preset dialog box, and click **OK**.

5 Click **Find**. Jobs that match the criteria in the Find grid are displayed in the Results grid area.

6 In the Update grid area, choose or fill in the following information:

- one of the following update actions:
  - Update - value of field is changed regardless of the previous value
  - Update where - value of field is changed depending on the previous value
  - Add - a new item is added to a list field such as In conditions
  - Remove - an item is removed from a list field such as In conditions
- field in the job or group processing definition to be updated
- an operator
- a search value
- an assign function or replacement value, if the search value is found

NOTE

When updating a table to become a SMART Table, a Rule-Based Calendar must be defined or the table entity will be marked as invalid. See "Defining scheduling criteria for a SMART Table" on page 129.

7 To add additional search criteria expressions, click , and repeat step 6 for each expression. There is a sequential relationship between the expressions. To change the order of the expressions click on the up and down arrow icons. To delete criteria expressions, select the expression and click .

8 Click **Update** to perform the update.

The tables that follow provide a description of the search criteria used in finding and updating jobs and tables.

Table 46 FIND and Update actions

Expression Type	Description
Find	Evaluate simple fields such as Job Name and Application, according to the find operator and find value selected. For example: Find Control-M like “ABC*”
Find any	Specifies list fields such as In Conditions and Shouts and updates or evaluates as specified in the sub-expressions of this complex expression. Example 1: “Find any Control Resource” matches to any job that has at least one control resource defined. Example 2: “Find any Control Resource where Name like C*, D*” matches to any job that contains at least one control resource that starts with the letter C or D.
Update	Update simple or sub-fields as defined (not conditional).
Update where	Conditional updates of simple fields or sub-fields. For example: “Update where Application starts with the letter A replace substring A with xyz,” updates application fields that start with the letter A and replaces every occurrence of the letter with the substring xyz.
Add	Adds a new complex field into a list field. For example: Add In Condition: ■ Set Name like **“incondition1”** ■ Set Date like **“ODAT”** Add a new in condition to all jobs found (according to the rest of the criteria) and set the sub-fields as defined.
Remove	Removes a complex field from a list field. For example: Remove Shout: ■ Where To like **“EM”** Removes all shouts to destination EM from all jobs found according to the rest of the criteria.

Table 47 FIND operators

Operator	Description
like	Enhances regular expressions supported. For more information, see "Pattern-matching strings" on page 387. It is supported by the like operator in all other windows (for example, viewpoint collection definition, and alert filter).
not like	The opposite of "like".
is (exactly)	The field value is equal to the value provided (exact match, no wildcards or regular expressions).
is not (exactly)	The field value is not equal to the value provided.
starts with	The field value starts with the value provided. Pattern-matching rules apply. Special characters such as '*' are not processed as literals unless there is a backslash. ■ DESCRIPTION Starts with "abc*" ■ Matches DESCRIPTION values "abcd", "abc888", and "abc*" ■ The DESCRIPTION that starts with "abc*", matches only DESCRIPTION values "abc*999", "abc*ddd" etc.
ends with	The field value ends with the value provided. Pattern-matching rules apply.
contains	The field value contains the substring (exact or pattern) provided. Pattern-matching rules apply.
doesn't contain	The field value does not contain the substring (exact or pattern) provided. Pattern-matching rules apply.
is empty	The field has no value (NULL or empty string).
is not empty	The field has ANY value.
< or < = or > or > =	Used for numeric or lexicographic comparison.

Table 48 Update Operators (Part 1 of 2)

Action	Description
assign	Assigns the value as is (no functions, place holders or regular expressions). If the field contains several values (a list field, such as scheduling **Dates** field), you can add or modify values in the list, by providing comma-separated values. If only one value is specified, only the first value in the list field is updated. For example, to add three scheduling dates to the list use: Update "Dates" assign "0909,0807,0221"

Table 48 Update Operators (Part 2 of 2)

Action	Description
assign function	Table 83 on page 391 describes special functions that you can use to specify complex assign function values using the Insert Function dialog box. Additionally, the '*' character is a special place holder of the previous field value (or a part of it). Examples: ■ Set the job's **MEMLIB FROM '/home/user1/*'** TO **'/home2/user3/*'** ■ Update where Out Condition Name like "*" assign function **"*@HHMMSS"**. The condition name is evaluated and set by Control-M at runtime, enabling users for example to create unique condition names in cyclic jobs. The character '*' has a special meaning and can save the previous field value. ■ Update Application assign function to new{Application}.
clear	Clears the field value. Fields that are assigned with a predefined set of values reset to the default value.
replace substring	Replace all occurrences of the substring specified in FROM field with the one specified in the TO field (which may be empty). For example, If the field contains several values (a list field, such as the "SAP R3:Variant Name" field), you can replace a substring like "VAR1" with another string "VAR2" in all cell values using the following statement: Update "SAP R3:Variant Name" replace substring "VAR1" "VAR2"
replace expression	Regular expressions search and replace support (can use references to numbered groups). For example, Update Application replaces expression (.*)account(.*) with \2account\1 In this example, if the Application's original value was GLOBALaccount45, the update is set to 45accountGLOBAL. If the field contains several values (a list field, such as the "AFT::File Path on Host 1" field), the assign operator allows you to modify the whole list at once, using comma-separated values. However, you can set all cell values with the same "test" value like this: Update "AFT::File Path on Host 1" replace expression ".*" "test"

Managing updated jobs

When processing update expressions, if the conditions of a particular expression is not met, the expression is skipped and the next expression is evaluated.

However, if a particular update expression fails (for example, if the specified change is not supported) the job will not be updated for any of the other expressions and the update process will skip to the next job. In the list of results, the job is marked as “skipped”.

To correct a job with a validation error

1 In the Results grid area, click **Validate...**

2 In the Validity Checks dialog box, double-click a validation error. The job editing form opens and the invalid field value is highlighted.

3 Enter the correct value and click **Save and Close**.

To rollback updates

1 Select the jobs in the Results grid area that you want to rollback.

2 Click **Rollback Updates**.

To highlight a job in the Desktop

1 Ensure that the **Select in View** toggle button appears pressed.

2 Select the job in the Results grid area that you want to highlight. You can then view it highlighted in the Flow diagram, Gantt view, or List view.

Chapter 11

Setting up definitions for periodic statistics collection

This chapter presents the following topics:

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Defining periodic statistics definitions 186
Changing periodic statistics definitions 186
Managing periodic statistics definitions 187

Introduction

If for a specific job or set of jobs there is usually a variation in statistic values for different periods during the week, month, or year, there is a great advantage in collecting the statistics separately for each distinct period. Statistics which are collected separately for each period are called periodic statistics, and are managed using the Periodic Statistics Manager.

EXAMPLE

If the average runtime of a job during work days is different than during weekends there is an advantage of collecting statistics for this job separately for work days and for weekend periods. The average runtimes will then be much more accurate for each period.

This section describes how to collect periodic statistics using the Periodic Statistics Manager.

Defining periodic statistics definitions

A periodic statistics definition determines the periods according to which statistics are collected for a specific job or set of jobs. These periods are defined in a Periodic Calendar, using the Calendar Manager. The periodic statistics definition relates the desired Periodic Calendar to a job or set of jobs.

To relate a Periodic Calendar to a job or set of jobs do the following:

- Use the Calendar Manager, available in Control-M/Desktop, to find or create an appropriate Periodic Calendar.
- Use the Periodic Statistics Manager, available in Control-M/Desktop, to create a periodic statistics definition.

To display the Calendar Manager, select **Tools => Calendar Manager**. For details about defining and using Periodic Calendars, see Chapter 8, "Using predefined calendars to schedule jobs."

To display the Periodic Statistics Manager, select **Tools => Periodic Statistics Manager**.

A list of periodic statistics definitions are displayed in the Periodic Statistics Manager. The user must arrange the periodic statistics definitions in order of precedence, so that if a job is included in two or more periodic statistics definitions, the definition with the greater precedence (higher up on the list) is applied to the job. By default, new definitions are added to the bottom of list as they are created. Since the order of the definitions is important, the list cannot be sorted.

NOTE

A statistics calendar that is defined in an MVS job takes precedence over a Periodic Calendar that is related to the job through the Periodic Statistics Manager.

Changing periodic statistics definitions

The following use cases involve changing the periodic statistics definitions.

Consider the case where periodic statistics are collected for the following two periods: weekends (defined as period A) and weekdays (defined as period B). Initially, Friday is considered a weekday, but after a few weeks have passed, it is decided to consider Friday as part of the weekend. To reflect this change, all Fridays in the Periodic Calendar are marked with "A's" instead of a "B's".

In this case, the statistics collected on the Fridays before the change, remain part of the weekday statistics, since the periodic statistics are not recalculated retroactively. When a change is made in the Periodic Calendar, only future statistics calculations are affected.

Consider the case where the holidays for the current year are marked in the Periodic Calendar with the letter "G". In this case, holidays for future years should also be marked with the same letter, "G". This ensures that statistics collected during holidays in the current year will be used for jobs that will run on holidays of future years. If, over time, more than one period letter is used to mark holidays, each set of holidays marked by a different letter is considered a different period.

Managing periodic statistics definitions

Table 49 lists periodic statistics management tasks you can perform with the Periodic Statistics Manager.

Table 49 Periodic statistics management tasks

Task to perform	How to perform it
to create a periodic statistics definition	Click (**New**). For additional details, see "To create a periodic statistics definition" on page 187.
to change the basic details of a periodic statistics definition	Select the periodic statistics definition and click (**Edit**). For additional information, see "To change the basic details of a periodic statistics definition" on page 188.
to change the precedence of a periodic statistics definition	Click (**Move Up**) and (**Move Down**). For additional details, see "To change the order of precedence of a periodic statistics definition" on page 188.
to copy a periodic statistics definition	Select the periodic statistics definition and click (**Copy**). For additional details, see "To copy a periodic statistics definition" on page 189.
to delete a periodic statistics definition	Select the periodic statistics definition(s), click (**Delete**). For additional details, see "To delete a periodic statistics definition" on page 189.

To create a periodic statistics definition

1 In the Periodic Statistics Manager window, click (**New**), which opens the Periodic Statistics Definition dialog box.

2 Fill in the details for the new periodic statistics definition, as follows:

A Specify a name and enter a description for the periodic statistics definition.

B Choose an appropriate Periodic Calendar by specifying the name of the Control-M where the calendar is defined and the name of the Periodic Calendar.

NOTE

Although the Periodic Calendar might be defined for a particular Control-M server, the Periodic Statistics Manager ensures that the new periodic statistics definition is applied globally to all jobs included in the definition, regardless of which Control-M server runs the job.

C Fill in the job filter criteria. The fields of the job filter support regular expressions. Statistics are collected for jobs matching these criteria according to the periods of the Periodic Calendar specified in the previous section.

3 Click **OK**. The Periodic Statistics Definition dialog box closes, putting the new periodic statistics definition into the temporary Periodic Statistics Manager buffer. You can now repeat the procedure from Step 1, creating additional periodic statistics definitions.

4 Click **OK** or **Apply** in the Periodic Statistics Manager window to save the newly created periodic statistics definitions.

NOTE

Before saving the new periodic statistics definitions, you can arrange the order of their precedence using the **Move Up** and **Move Down** arrow buttons.

To change the basic details of a periodic statistics definition

1 In the Periodic Statistics Manager, select the periodic statistics definition in the list and click **(Edit)**.

2 In the Periodic Statistics Definition dialog box, make the changes and click **OK.**

3 Click **OK** or **Apply** in the Periodic Statistics Manager window to save the edited periodic statistics definition.

To change the order of precedence of a periodic statistics definition

1 In the Periodic Statistics Manager, select the periodic statistics definition in the list and click the **Move Up** and **Move Down** arrow buttons, as needed, to move the definition to the required position in the list.

2 Repeat Step 1 for any periodic statistics definition that you want to reposition.

3 Click **OK** or **Apply** in the Periodic Statistics Manager window to save the new order of precedence for the periodic statistics definitions.

To copy a periodic statistics definition

1 In the Periodic Statistics Manager, select the periodic statistics definition to be copied, and click (**Copy**).

2 In the Copy Periodic Statistics Definition dialog box, specify a name for the new periodic statistics definition in the **Name** field, modify the other criteria as needed, and click **OK**.

3 Click **OK** or **Apply** in the Periodic Statistics Manager window to save the edited periodic statistics definition.

To delete a periodic statistics definition

1 In the Periodic Statistics Manager, select the periodic statistics definition, click (**Delete**).

2 Click **OK** or **Apply** in the Periodic Statistics Manager window to save the change.

Part 3

Moving to production

This part presents the following topics:

Chapter 12
Introduction to moving to production 193

Chapter 13
Putting jobs into production 195

Chapter 14
Automating job scheduling and maintenance 203

Chapter 15
Identifying data center resources available for Control-M use 205

Chapter 16
Establishing job dependencies across Control-Ms 213

Chapter 12

Introduction to moving to production

This chapter presents the following topics:

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Moving to production

After you have defined tables and jobs, to move to production you must perform the following tasks:

- Move the jobs to production
- Automate job scheduling by using New Day processing
- Define resources to Control-M
- Define global conditions to establish job dependencies globally

Where to go from here

- To move jobs into production, see Chapter 13, “Putting jobs into production.”
- To automate job scheduling, see Chapter 14, “Automating job scheduling and maintenance.”
- To define resources to Control-Ms, see Chapter 15, “Identifying data center resources available for Control-M use.”
- To define global conditions, see Chapter 16, “Establishing job dependencies across Control-Ms.”

Chapter 13

Putting jobs into production

This chapter presents the following topics:

Writing tables to the Control-M/EM database 195
Uploading tables to the Control-M database 196
Manually scheduling jobs and tables 198
Downloading tables from Control-M to Control-M/EM 200

After you have finished defining or modifying job processing definitions, to use them you must ensure that the tables that contain them are written to the Control-M/EM database and loaded to the appropriate Control-M database.

Writing tables to the Control-M/EM database

If you are working in an online workspace or using the Table manager, when you save your work, the Control-M/EM database is directly updated, so there is no need to perform a write operation.

A write operation is only relevant when you are working in a local workspace.

To write a table to the Control-M/EM database

1 From your local workspace in Control-M/Desktop, do one of the following:

- To write multiple tables:

  1. Choose **File => Write to Control-M/EM**.

  2. In the displayed Write to Control-M/EM dialog box, select the tables and click **Write**. (To filter the display, select the filtering criteria and click **Apply**.)

- To write an individual table, do the following:

1. If the Control-M hierarchy is not displayed, choose **View => Hierarchy => Data Center/Table/Job**.

2. In the flow diagram or navigation tree, right-click the table node, and in the pop-up menu choose **Write**.

2 If the Confirm Write Tables dialog box is displayed, it means that the tables listed in the dialog box (that you are trying to write) already exist in the Control-M/EM database and are unlocked. If you continue the write operation on those tables, you will overwrite the existing version.

Click the check box next to the tables that you want to overwrite, and click **Write**.

Depending on how system parameters are set, after you click **Write** in the Confirm Write Tables dialog box, Control-M/Desktop might prompt for an additional confirmation.

WARNING

BMC Software recommends that you not overwrite any tables unless you are certain that you are not overwriting any important data.

The results of the Write operation are displayed in the Write Tables Results dialog box.

NOTE

This operation does not upload to the Control-M database. To use the changes in production, you must still perform an upload.

Uploading tables to the Control-M database

The upload operation copies the tables from the Control-M/EM database to the Control-M database. Therefore, you must ensure that your changes are first saved in, or written to, the Control-M/EM database before you upload them to the Control-M database.

By default, you perform write and upload operations separately. However, by changing the default setting of the Write before upload (in local workspace) option in the General panel of the Control-M/Desktop Options dialog box, you can ensure that whenever you perform an upload, a write operation is automatically performed first. (This option lets you to perform both a write and an upload using a single upload request.) For details, see the option description in Table 67 on page 351.

You can upload a table from either the Table manager or the flow diagram. (If you happen to be Saving and Ordering a job in the job editing form, you can also upload the job's table as part of the Save and Order request. For details, see "Manually scheduling jobs and tables" on page 198.)

To upload tables to the Control-M database

From one of the following locations, upload the table to the Control-M database:

- From a workspace (online or local), do the following:

  1. If the Control-M hierarchy is not displayed, choose **View => Hierarchy => Data Center/Table/Job**.

  2. In the flow diagram or navigation tree, right-click the table node, and in the pop-up menu choose **Upload**.

  3. If you are prompted for confirmation, confirm.

- From the Table manager, do the following:

  1. Select the table(s) to be uploaded.

  2. Click

. If you are prompted for confirmation, confirm.

Control-M / Desktop uploads the table to the Control-M database. (If you are working in a local workspace, and you adjusted the Write before upload (in local workspace) option in the General panel of the Control-M / Desktop Options dialog box appropriately, Control-M / Desktop automatically writes the table to the Control-M / EM database before uploading it to the Control-M database.)

TIP

If the Control-M database contains a more recent version of the table you are trying to upload, an "Already Updated" error is issued and the upload is prevented. To force the upload in this case, click **Force Upload**.

Manually scheduling jobs and tables

Ideally, the process of job and table ordering should be automated at your site (for details, see Chapter 14, "Automating job scheduling and maintenance"). However, you can manually order or force jobs or tables from Control-M / Desktop at any time.

NOTE

- When you order or force a table, what you really order (or force) are the jobs in the table and any nested Sub-tables.
- When you manually order or force tables or a job in Control-M / Desktop, the Order / Force dialog box lets you automatically place the tables into the production databases (the Control-M / EM database and the Control-M database).
- The status of ordered tables, jobs and Sub-tables is set to WAIT_SCHEDULING.
- You can order or force tables and jobs from Control-M / EM. However, the dialog box and process are different. For details, see "Manually rescheduling jobs in the active environment" on page 272.

To order or force tables or a job

1 Perform one of the following:

- To order or force a SMART Table, right-click on the SMART Table in the tree view or flow diagram.
- To order or force a job or SMART Table, click **Order** in the action menu.
- To order or force a job, SMART Table, or Sub-table, display the job editing form or table editing form and then click **Save and Order** in the toolbar at the top of the form.

NOTE

Sub-tables cannot be ordered, they can only be forced into other tables using the **Order/Force Into Table** option. For details see "Manually rescheduling jobs in the active environment" on page 272.

- To order or force tables from the Control-M / Desktop window, do the following:

  A. If the Control-M hierarchy is not displayed, choose **View => Hierarchy => Data Center/Table/Job**.

  B. In the flow diagram or navigation tree, select the tables by right-clicking the table icon, and in the pop-up menu choose **Order**.

C. If you are prompted for confirmation, confirm.

- To order or force tables from the Table manager, do the following:

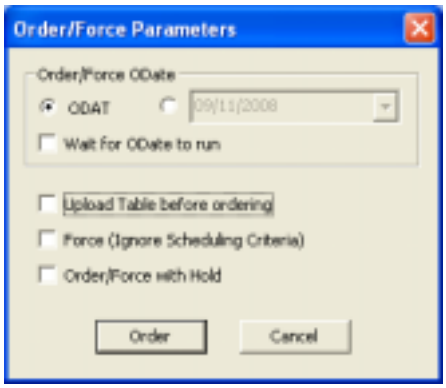
A. Select the tables.

B. Click Order.

C. If you are prompted for confirmation, confirm.

The Order / Force Parameters dialog box is displayed.

Figure 13 Order/Force Parameters dialog box (in Control-M/Desktop)



2 Fill in the Order / Force Parameters dialog box, as follows:

- If you are ordering (rather than forcing), to specify a different date than ODAT (the default), click the button by the date selection field and select the date.

NOTE

If you are ordering a table under Control-M for z / OS version 6.2.00 or later, to ensure that the jobs do not run before the Odate, check the **Wait for Odate to run** check-box. (If this box is not checked, the job runs as soon as its execution criteria are satisfied.)

- To place the table into the Control-M database before ordering, click **Upload Table before ordering**.

TIP

- If you are working in the Control-M / EM database (that is, in Online mode or the Table manager), you should update the Control-M / EM database by performing a Save before you perform an upload.
- If you are working in local mode, when you request an Upload, Control-M / EM automatically writes the table to the Control-M / EM database before performing the upload (default). This makes it unnecessary for you to manually perform the Write.

WARNING

If you modified the job or table but did not upload the changes, the version of the tables and jobs currently residing in the Control-M database will be ordered or forced. In this case

- the modifications are not reflected in the job order
- if you saved the modifications in Online mode, the Control-M/EM database and Control-M database will not be synchronized; an error message will be issued

- To force the table, click **Force (Ignore scheduling criteria)**.
- To order or force a job so that it is automatically put on hold as soon as it starts to run, click **Order/Force with Hold**. This enables you to customize an individual run of a job using AutoEdit variables. (This feature is available only for versions 6.2.01 and later of Control-M.)

3 Click **Order**, which displays the progress of the order or force action in the Action Report.

4 Click **Close** at any time to close the Action Report.

The table is first written to the Control-M/EM database, and then uploaded to the Control-M/Server. It is then ordered if its scheduling criteria are satisfied or forced into the active environment. The table's status is set to Executing.

When a job that is associated with a SMART or Sub-table is forced into an existing table or Sub-table that has already completed, the status of all parent tables is set to Executing if possible. If it is not possible due to scheduling criteria the job will remain in WAIT_SCHEDULING status. For more information see "Manually rescheduling jobs in the active environment" on page 272.

Downloading tables from Control-M to Control-M/EM

It is usually not necessary to download tables from Control-M to Control-M/EM, because a table in Control-M is not normally more current than the same table in Control-M/EM. Nevertheless, there might be instances when you want to perform a download. For example, if someone incorrectly modified the table and wrote the changes to Control-M/EM, you might want to overwrite the incorrect Control-M/EM version with the version from Control-M.

To download tables from Control-M to Control-M/EM

Download the table from one of the following locations:

- In the Control-M / Desktop window, do the following:

  1. If the Control-M hierarchy is not displayed, choose **View => Hierarchy => Data Center/Table/Job**.

  2. In the flow diagram or navigation tree, right-click the table icon, and in the pop-up menu choose **Download**.

  3. If you are prompted for confirmation, confirm.

- From the Table Manager, do the following:

  1. Select the tables to be downloaded.

  2. Click (**Download**).

  3. If you are prompted for confirmation, confirm.

TIP

To download a table that is not displayed in the Table Manager window, create the table and then download the table normally.

Chapter 14

Automating job scheduling and maintenance

Identifying automation criteria for tables. 204

After job processing definitions have been defined for your production jobs, you can automate daily job ordering (and daily maintenance) through a feature called New Day processing. At the same (site-defined) time each day (called New Day time), Control-M automatically runs a procedure called the New Day procedure. A site can set the same or a different New Day time for each Control-M.

The New Day procedure contains instructions for running a number of maintenance and cleanup utilities that, among other things, archive the previous day's processing, and remove the previous day's jobs and conditions.

The New Day procedure is also responsible for placing jobs that should be ordered that day into a file called the Active Jobs file. Control-M automatically submits jobs in the Active Jobs file when their submission criteria are satisfied.

- The New Day procedure can directly order jobs that need scheduling to the Active Jobs file (a method sometimes suitable for small data centers).
- The New Day procedure can order special jobs called User Daily jobs, which, in turn, order jobs that need scheduling (a method more suited for large data centers). Each User Daily job scans tables specifically assigned to it, looking for jobs that should be scheduled that day, and orders them to the Active Jobs file.

SMART Tables are ordered only if the scheduling criteria of at least one Rule-Based Calendar in the table is satisfied. Whether individual jobs in the SMART Table are ordered depends on the relationship between the individual job scheduling criteria and the selected Control-M level Rule-Based Calendars, which is set by selecting either **And** or **Or** (see "Determining whether jobs in a SMART Table will be scheduled" on page 136), and on the values of job-specific basic scheduling parameters.

For instructions on defining the New Day procedure and User Daily jobs, see the *Control-M Administrator Guide* for the particular Control-M platform.

Identifying automation criteria for tables

For a table to be automatically ordered during New Day Processing, it must be assigned to the New Day procedure or a User Daily job.

To assign or reassign a table to the New Day procedure or a User Daily job

1 Display the Table Manager window by choosing **Tools => Table Manager** in Control-M/Desktop. To filter the list of tables, use the fields at the top of the Table Manager.

2 In the Table Manager, select the table and click (**Table Details**).

3 Edit the **User daily** field as follows (you must have authorization):

- If the table should be ordered by a specific User Daily job, specify the name of the job (1-10 characters, case sensitive).
- If the table should be ordered by the New Day procedure, specify the value **SYSTEM** (uppercase only).

4 Click **Save** or **Save & Close** save the changes in the Control-M/EM database.

5 To upload the changes to the Control-M, select the table in the Table Manager and click .

WARNING

If you modify a table associated in Control-M with more than one User daily and then upload it to Control-M, the table is removed from all User Dailies except the one it is associated with it in Control-M/EM.

Chapter 15

Identifying data center resources available for Control-M use

This chapter presents the following topics:

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Allocating control resources. 207
Viewing the list of jobs and tables that use a control resource. 209
Defining quantitative resources 209
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Introduction

To ensure Control-M does not submit a job unless all resources that the job requires are available, Control-M provides a feature for specifying resource requirements. Resources are logical constructs that can be of one of the following types:

- Control resources — these are resource requirements generally characterized by the control that a job needs over them: exclusive or shared. Data information resources, such as files, tables, and databases, are frequently control resources.

- Quantitative resources — these are resources requirements that are generally quantified. Physical resources, such an quantity of memory, percentage of CPU, megabytes of storage, or number of tape drives, are frequently quantitative resources.

The success of this feature requires that the following be specified for each resource:

- The resource must be associated with a specific Control-M that tracks the availability of the resource in the data center. This chapter describes how you perform this task in Control-M/EM.

- You must specify the resource usage requirement in the job processing definition of the job requiring the resource. You perform this task in Control-M/Desktop. For details, see "Allocating resources for a job" on page 110.

The following example illustrates control resource usage.

EXAMPLE

A job called **DeductCharges** requires exclusive control of a file called **AcctBalance**. To enable Control-M to handle this correctly, do the following:

- In the job processing definition of **DeductCharges**, specify exclusive control of a control resource called **AcctBalance**.

- Using the Control Resources dialog box in Control-M/EM, allocate the control resource, **AcctBalance**, to Control-M.

Control-M will only submit **DeductCharges** if **AcctBalance** is not being used by another job. If another job also requires **AcctBalance**, it will not be submitted as long as **DeductCharges** is running.

The following example illustrates quantitative resource usage.

EXAMPLE

Control-M has three tape drives available. A job called **BKP_Tallies** requires one tape drive. To enable Control-M to handle this correctly, do the following:

- In the job processing definition of job **BKP_Tallies**, specify that the quantity, **1**, of a quantitative resource, **TapeDr**, is required.

- Using the Quantitative Resources dialog box in Control-M/EM, define a quantitative resource, **TapeDr**, having a total quantity of 3, to Control-M.

Whenever a job using **TapeDr** is submitted, Control-M drops the currently available quantity of the resource by the quantity the job uses, until the job ends. Control-M will only submit **BKP_Tallies** if there is at least one **TapeDr** available.

Filtering resources on startup

You can filter resources on startup before they are loaded from the database. This is recommended when working with a large amount of resources. In the status bar you can view the filter criteria.

To filter resources on startup:

1 Choose **Options=> Show 'Refresh Filter' on startup.**

2 In the Refresh Filter dialog box, fill in the data that defines the resource and click **OK**.

To change the filter:

1 Choose **View=>Refresh Filter**.

2 In the Refresh Filter dialog box, fill in the data that defines the resource and click **OK**.

Allocating control resources

You allocate, release, and view control resources in your production environment using the Control Resources window.

NOTE

You can filter resources on startup before they are loaded from the database. This is recommended when working with a large amount of resources. For more information on filtering resources on startup, see "Filtering resources on startup" on page 207.

To allocate or release a control resource

1 In the Control-M/EM GUI, choose **Tools => Control Resources**, which displays the Control Resources window.

2 In the Control Resources window, do the following as needed:

- To quickly filter, choose **View => Filter Row**, and enter the filter criteria.
- To filter the displayed data, click on the right top corner of a column header and select the appropriate filtering option.

- To create an advanced filter, right-click on any column header and choose **Filter Editor**. Use the Filter Builder to enter the appropriate filtering criteria and the relationships between them.

  The following information is useful for understanding the filtering criteria:

  — Type — Types of control:

  - Exclusive — resources "owned" exclusively by one job
  - Shared — resources shared by a number of jobs
  - Requested — resources requested by a critical job (a **Requested** entry exists for each job that requests the resource needed by a critical job)

  — RBA — (For z/OS only) Relative Byte Address, a unique identifier.

  — Priority — it contains the priority (indicated by one character, 0-9/A-Z) of the critical path job waiting for exclusive control of the resource. The field only appears in entries of critical path jobs waiting for a resource. In all other entries the field is blank.

  — Counter —indicates the number of jobs currently using the resource. (This value is not relevant for requested resources. The value is always **1** for exclusive resources.)

3 To allocate a control resource do the following:

A In the Control Resources window, choose **Actions => Add**.

B In the displayed Control Resource dialog box, fill in the data to associate the control resource with a Control-M data center, specify the type of control, and click **OK**.

4 To release a control resource, select it and choose **Actions => Delete**.

NOTE

You can delete a **Shared** control resource only if

- no jobs "own" the resource, that is, the **Counter** field is **0** for all resource table entries for the resource
- no jobs are requesting the resource, that is, there are no table entries for this resource with a **Requested** resource type

Viewing the list of jobs and tables that use a control resource

You can view a list of jobs and SMART Tables for which a selected control resource is specified. This list might help identify potential sources of resource contention. For example, if too many jobs require exclusive control of a resource, you might want to see if it is possible to give some of the jobs shared control.

Because the list of control resources only displays resources in use at the time of the last update, only jobs and tables that use those resources are in the list. From the displayed list of jobs, you can display a job in the job editing form.

To view the job list for a resource

1 If the Control Resources window is not displayed, choose **Tools => Control Resources** in the Control-M/EM GUI, and set the filtering criteria in the Control Resources window (see "To allocate or release a control resource" for details).

2 In the Control Resources window, select the resource and click **View Jobs**, which displays the View Jobs dialog box.

3 To edit a job (or SMART Table) in the list (optional), double-click the job, which displays the job editing form or table editing form for the selected item.

NOTE

If you do not have authorization to view job details, the job or table editing form is not displayed; only the **RBA** value is displayed.

Defining quantitative resources

You create, delete, and view quantitative resources in your production environment by using the Quantitative Resources window.

NOTE

You can filter resources on startup before they are loaded from the database. This is recommended when working with a large amount of resources. For more information on filtering resources on startup, see "Filtering resources on startup" on page 207.

To create or delete a quantitative resource

1 In the Control-M/EM GUI, choose **Tools => Quantitative Resources**, which displays the Quantitative Resources window.

2 In the Quantitative Resources window, do the following as needed:

- To quickly filter, choose **View => Filter Row**, and enter the filter criteria.
- To filter the displayed data, click on the right top corner of a column header and select the appropriate filtering option.
- To create an advanced filter, right-click on any column header and choose **Filter Editor**. Use the Filter Builder to enter the appropriate filtering criteria and the relationships between them.

  The following information is useful for understanding the filtering criteria:

  — Type — type of quantitative resource entries to display:

  - **Defined**— displays all defined resources. General information about the resource. Only one definition entity exists per resource. This entity is added by the user to define a new quantitative resource.
  - **In Use** —displays only resources being used by a job (an **In Use** flag exists for each Control-M job that is currently using the resource).

- **Required** —displays only resources requested by a critical job (a **Required** flag exists for each critical job that requests the resource).

— Resource — note that quantitative resources used for load balancing have the ***resource_name@node_ID*** name format. In this format**,** *node_ID* specifies the Agent platform on which the resource is located. If a critical job to be submitted by the load balancing mechanism is waiting for available resources, the required resources are displayed in this window using the ***resource_name@*** format.)

— Quantity — for an entry whose type is **Defined**, this column indicates the number of units of the resource that are currently available. For **In Use** and **Required** entries, this column indicates the number of units of the resource currently used by the job specified by its RBA.

— Maximum —for an entry whose type is **Defined**, this column indicates the maximum quantity of the resource existing in the Control-M installation. For **In Use** and ***Required*** entries, the value in this column is **0**.

— Priority — for an entry whose type is **Defined**, this field is not applicable. For entries with a type of **In Use** or **Required**, **Y** or **N** indicates whether the job identified in RBA is critical.

— RBA — (for z/OS only) this field displays the Relative Byte Address, a unique identifier. For an entry whose type is **Defined** or **Required**, RBA is not applicable. For **In Use** entries, this column contains the RBA of the z/OS job using the resource.

3 To create a quantitative resource

A In the Quantitative Resources window, choose **Actions => Add**.

B In the displayed Quantitative Resource dialog box, fill in the data that defines the quantitative resource.

C Click **OK**.

4 To delete a quantitative resource, select it and choose **Actions => Delete**.

NOTE

You can delete a quantitative resource only if

- no jobs “own” the resource, that is, the **Counter** field is **0** for all resource table entries for the resource
- no jobs are requesting the resource, that is, there are no table entries for this resource with a **Requested** resource type

Chapter 16

Establishing job dependencies across Control-Ms

This chapter presents the following topics:

Defining global conditions 213
Deleting global conditions 215
Global condition logic and examples 216
Best practices. 218
Frequent updates to a global condition (toggles) 218
Bi-directional global conditions. 218

Normally, prerequisite conditions used to establish job dependencies are local — that is, they apply only on the particular Control-M in which they are defined. This chapter explains how you can define global prerequisite conditions to establish job dependencies across different Control-Ms. You establish these dependencies by defining condition name prefixes that will indicate that a condition is global.

Defining global conditions

Global conditions are special case prerequisite conditions that create dependencies between jobs running on different Control-M servers. (For example, you can specify that jobs in Control-M servers in Rome and Paris begin executing only after successful completion of a job in Sydney.)

Global conditions are like normal prerequisite conditions except that their names begins with a prefix that identifies the condition as a global condition. When you define global conditions, what you actually define are the following:

- prefixes (up to 255 characters long) that indicate that a condition is a global condition

- **From** and **To** Control-M servers for which the global condition prefix is relevant

  When Control-M/EM detects the addition or deletion of a global condition in a **From** Control-M, it automatically adds or deletes the same global condition in the designated **To** Control-M installations.

TIP

By appropriately designating the same Control-M installations as both **From** and **To** Control-Ms, you can create "bi-directional" flows (as opposed to From/To flows). In this case, addition or deletion of a global condition in any such installation will always result in the automatic addition or deletion of the global condition in the opposite direction. For Best Practices implementation tips, see "Bi-directional global conditions" on page 218.

You define and manage global conditions in the Global Conditions dialog box, which you display from either Control-M/Desktop or Control-M/EM. After a global condition is defined, you can handle it (for example, view or delete it) like a non-global prerequisite condition, from the **Prerequisite Conditions** dialog box.

To define and manage global conditions, you need appropriate security permissions.

To create or modify a global condition definition

1 In Control-M/EM or Control-M/Desktop, choose **Tools => Global Conditions**, which opens the **Global Conditions Prefixes** dialog box.

2 To refresh the display, click **Refresh**.

3 To filter the display, click the **Filter** check-box, fill in the filtering criteria in the fields at the top of the dialog box, and click **Apply**.

4 To add (or modify) a global condition definition, do the following steps:

A Click **New** (or select the condition and click **Update**).

B In the displayed Add New Global Condition dialog box, fill in or modify the definition, as follows:

- Specify the global condition prefix.
- Specify the **From** and **To** Control-Ms for which the global prefix will apply by selecting the Control-Ms and clicking **Add** or **Remove**.

WARNING

- When filling in the **Prefix** text box, be careful about specifying special characters, such as asterisks, as prefix indicator. Special characters in this field are treated as text characters, not wildcards, and unless you intend them as literals, they might cause undesired results. For example, if you specify **glo*** instead of **glo** as a global prefix, **glo*-job1_started** will be a global condition, but not **glo-job1_started**.
- Even truncated strings of the global condition prefixes must be unique or unpredictable results might occur. For example, do not define both a **DA** prefix and a **DAY** prefix because **DA** is a substring of **DAY** and therefore not unique.

If your site is planning on adding a new Control-M installation, you can add that Control-M to global condition definitions even though it is not yet functional and does not yet appear in the Control-M selection lists.

C To add an anticipated Control-M installation to a global condition definition, do the following:

- Click **Add New Control-M** in the **From** or **To** area.
- In the New Control-M Name dialog box, enter the name of the new Control-M and click **OK**.

D Click **OK**.

NOTE

- Changes made using the Global Conditions dialog box (for example, defining a new prefix) only affect conditions that are created or deleted after the change was saved.
- Although you can create any combination of global condition prefixes, BMC Software recommends that you
  - — limit the global condition prefixes to very specific, less general prefixes that do not match large numbers of conditions.
  - — refrain from defining prefixes that encompass a large number of Control-Ms in the **From** and **To** fields.

  The more general the prefix, the more stress is added to the system. This can slow down other requests and data transmissions. For more information about implementing global conditions efficiently, see "Best practices" on page 218.

Deleting global conditions

Select the condition in the Global Conditions dialog box, and click **Delete**.

Global condition logic and examples

When sending a global condition with an ODAT date reference to Control-Ms in different time zones, a problem can arise when target Control-M installations have an earlier current working date than the source Control-M (as a result of the time zone changes). Such a situation can be problematic due to the following:

- A global condition with ODAT as its date reference is assigned a date according to the Control-M that triggers its creation.
- During New Day processing cleanup, when Control-M detects an already existing condition having the new working date (month and day), it logically assumes that the condition is a holdover from the previous year because the production jobs that might create this condition during the new working date have not yet been run, and it deletes the condition.

EXAMPLE

Assume the following:

- New day processing in both Rome and San Francisco runs at 6:00 AM local time.
- At 8:00 AM in Rome, a job creates Global Condition: Glo1-RecReady with an ODAT date and sends it to San Francisco.
- At 9:00 AM in San Francisco, a job requiring that condition awaits submission.

The following occurs at new day in Rome on August 4th.

- August 4th at 6:00 AM in Rome — new day processing runs.
- August 4th at 8:00 AM in Rome — Global condition Glo1-RecReady is added with the date 0804. This global condition is then sent to San Francisco with a date of 0804 (the date the condition was created). However, the current working date and time in San Francisco when it receives the global condition is August 3rd, 23:00.
- August 4th 6:00 AM in San Francisco — New Day processing runs. During maintenance, it assumes that the Glo1-RecReady condition dated 0804 was added last year (because jobs that might have added the condition today did not run yet), and it deletes the condition.
- August 4th at 9:00 AM in San Francisco— a job in San Francisco waiting for the condition Glo1-RecReady dated 0804 is not submitted because the condition is already deleted.

In the event of a temporary communication failure between Control-M/EM and a Control-M installation, global conditions are accumulated and transmitted when communication is resumed.

Examples

The following examples illustrate how global conditions behave in a complex Control-M network. They are based on information the following table.

Prefix	From Control-Ms	To Control-Ms
GL1	ROME	NY,LA,SF
GLALL	*	PARIS,SYDNEY
GLNY	NY	*
GL2WAY	HQ,CENTER1	HQ,CENTER1

- If the GL1_JOB_END prerequisite condition is added in Control-M ROME, the same condition is automatically added in Control-M installations NY, LA, and SF. The Prerequisite Conditions window displays four different conditions called GL1_JOB_END, each belonging to a different Control-M (ROME, NY, LA, and SF).

- However, if this condition is added in any Control-M other than ROME, it is not automatically duplicated in other Control-M installations. If Control-M NY adds the condition GL1_JOB_END, it will not be automatically added in ROME (or anywhere else).

- If the GL1_JOB_END prerequisite condition is deleted in Control-M ROME, Control-M/EM deletes the GL1_JOB_END prerequisite condition in Control-M installations NY, LA, and SF (if the condition exists there).

- If the GL1_JOB_END prerequisite condition is created in Control-M ROME but Control-M SF is disconnected or downloading, Control-M/EM creates this condition in NY and LA only, and sends the change to SF when SF is able to receive updates.

- If the GLALL_OK prerequisite condition is added or deleted in any Control-M, the condition is automatically added or deleted in Control-M installations PARIS and SYDNEY. The asterisk (*) in the **From Control-M** field indicates all Control-M installations.

- If the GLNY_OK prerequisite condition is added or deleted in Control-M NY, the condition is automatically added or deleted in all other Control-M installations.

- If a prerequisite condition beginning with the GL2WAY prefix is added or deleted in either Control-M HQ or CENTER1, the same operation is performed on the corresponding condition in the other Control-M.

Best practices

This section provides recommendations for implementing global conditions between different Control-M installations.

Frequent updates to a global condition (toggles)

If the status of a global condition frequently changes (is added and deleted) within a short period of time, the Global Conditions server might become overloaded and the global conditions might not be distributed correctly.

To prevent this problem, find a balance for Global Conditions server processing by setting appropriate values using Global Conditions Server Parameters options from the root menu. These parameters define how the Global Conditions server should handle frequent updates to global conditions. For details, see the following menu options in the *Control-M Administrator Guide*:

- Delete Time For Sent Conditions
- Method for Handling Conflicting Conditions
- The Mode for Handling Conflicting Conditions

Bi-directional global conditions

Global conditions can be “bi-directional,” meaning that if a global condition is added or deleted in one of several Control-M installations, it is automatically added to or deleted from the others.

However, the definition of bi-directional global conditions generates additional overhead and puts additional stress on system processing, particularly in the Global Conditions server. This can slow down other requests and data transmissions. For this reason, BMC Software recommends that you avoid implementing bi-directional global conditions.

You can achieve the benefits of bi-directional global conditions using regular, one-way global conditions. This more efficient alternative involves

- definition of additional “dummy” jobs for maintaining (adding and deleting) global conditions
- definition of two global condition prefixes (instead of one), each representing a direction between the Control-M installations

- definition of two extra “dummy” global conditions for triggering the maintenance functions performed by the two “dummy” jobs

A sample implementation is provided below, first using bi-directional global conditions and then by simulating the use of bi-directional global conditions.

Sample scenario

A set of jobs can only run if the company’s intranet is up and running at all sites. Therefore, all sites (Control-M installations) have cyclic jobs that, at regular intervals, check intranet status and update the status using global conditions. If a particular intranet site in the company is down, a job deletes the global conditions that indicate that the intranet is up and running.

In this scenario, the company has two sites:

- one Control-M installation exists in Seattle
- another exists in London

In Seattle, a job called CheckS checks and updates conditions starting with the Intranet prefix (such as IntranetS-Up and IntranetL-Up). In London, a job named CheckL performs the same function. Addition and deletion of conditions with the Intranet prefix in either location should always occur in both locations.

Using bi-directional global conditions (not recommended)

The following representation of the Global Conditions window illustrates a basic and intuitive way to define bi-directional global conditions.

Prefix	From Control-Ms	To Control-Ms
Intranet	Seattle, London	London, Seattle

This definition specifies that addition and deletion of a condition that begins with the characters Intranet in either the Seattle or London site automatically generates the same update at the other site. This is a valid definition for bi-directional global conditions, but is not efficient.

Using regular global conditions (recommended)

For more efficient distribution and processing of global conditions, define jobs and global condition prefixes as follows.

The setup

In this scenario, you would create the following job processing definitions:

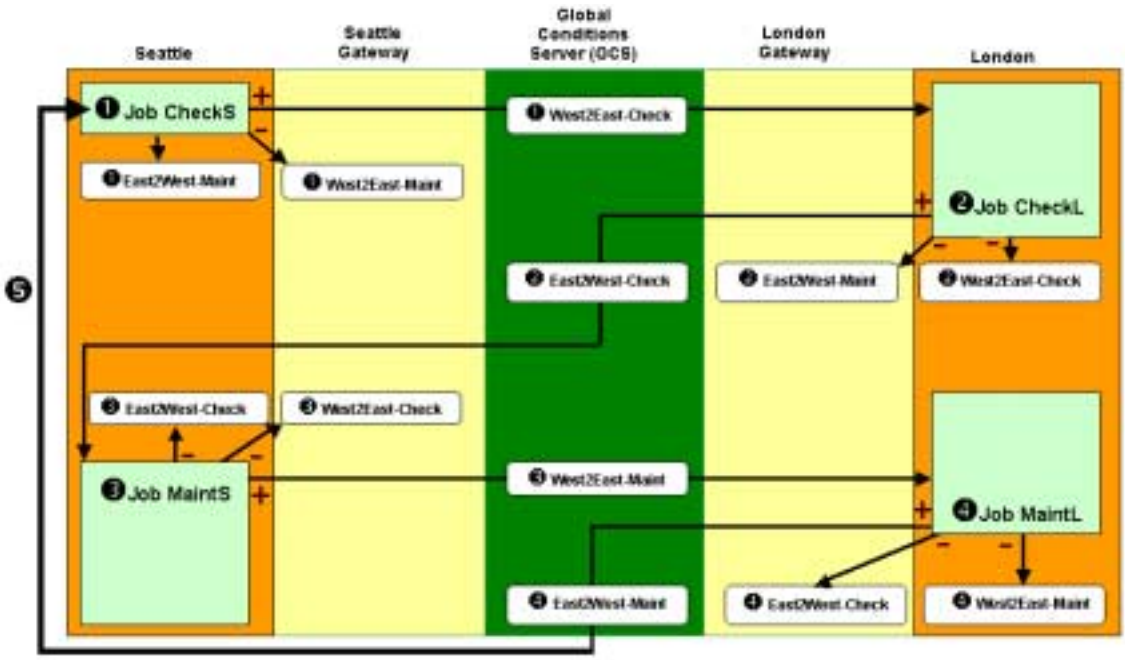
Jobs	Purpose
CheckS	In Seattle, this job checks intranet status and updates global conditions starting with the prefixes defined below. This job updates two global conditions (instead of one, Intranet, as was done in the sample above) with each global condition representing one direction. CheckS updates conditions with an West2East prefix. Updates to these conditions are passed towards the East to London.
CheckL	In London, checks intranet status and updates global conditions starting with the prefixes defined below. This job updates two global conditions (instead of one, Intranet, as was done in the sample above) with each global condition representing one direction. CheckL updates conditions with an East2West prefix. Updates to these conditions are passed towards the West to Seattle.
MaintainS	“Dummy” job processing definition in Seattle for removing global conditions that are no longer necessary; serves administrative and maintenance purposes only. MaintainS tracks, and deletes, unnecessary conditions by updating “dummy” global conditions.
MaintainL	“Dummy” job processing definition in London for removing global conditions that are no longer necessary; serves administrative and maintenance purposes only. MaintainL tracks, and deletes, unnecessary conditions by updating “dummy” global conditions.

Define the following job global condition prefixes:

Prefix	From Control-Ms	To Control-Ms
East2West	Seattle	London
West2East	London	Seattle

Processing flow: an overview

The following figure provides an overview of the processing flow of jobs defined when implementing the recommended practice for simulating bi-directional global conditions. Each phase in the processing flow is numbered and described in detail under “Processing flow: step-by-step” on page 221.



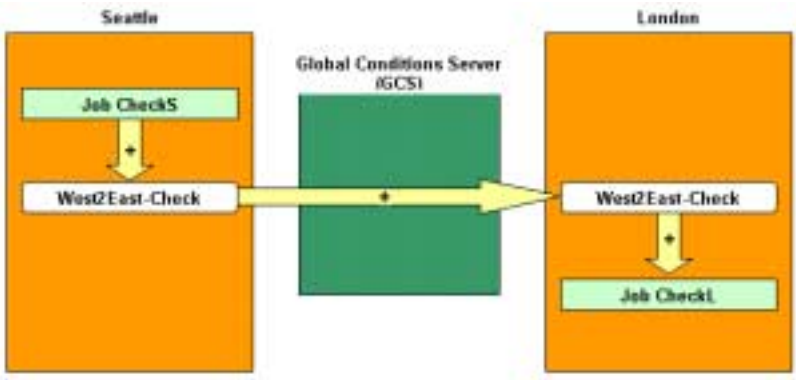
Processing flow: step-by-step

1 The **CheckS** cyclic job in Seattle runs when the **East2West-Maint** global condition is created (the first time, manually).

This job

— checks intranet status
— creates a global condition named **West2East-Check**

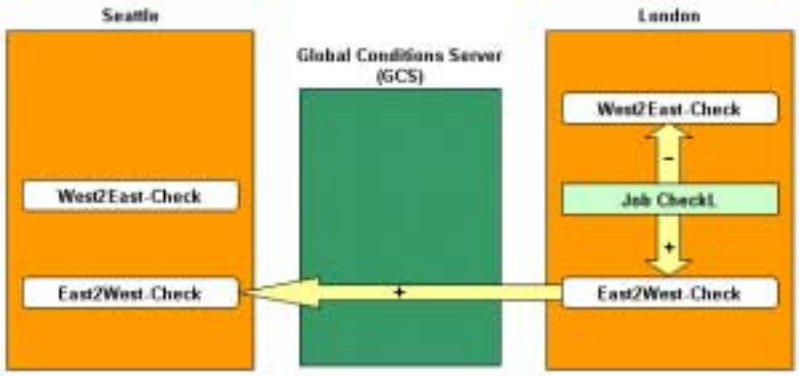
The Global Conditions server passes this condition to London.



2 The **CheckL** job is triggered by the creation of the **West2East-Check** In condition.

This job

— checks intranet status
— creates the **East2West-Check** condition
— deletes the **West2East-Check** condition locally (meaning, at the local Control-M installation only), because **West2East** is a one-way prefix



3 The **MaintS** job, which waited for the creation of its **East2West-Check** In condition, runs and

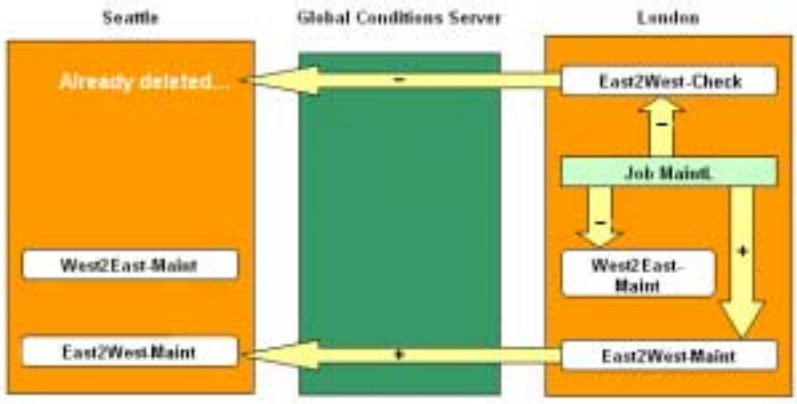
— creates the **West2East-Maint** condition
— deletes the **East2West-Check** condition locally
— deletes the **West2East-Check** condition in both Seattle and London

Because this condition was already deleted by **CheckL** in London, processing is minimal.

4 The **MaintL** job, which waited for the creation of its **West2East-Maint** In condition, runs and

— adds the **East2West-Maint** condition, which will trigger the **CheckS** job in Seattle
— deletes the **West2East-Maint** condition locally
— deletes the **East2West-Check** condition in both Seattle and London

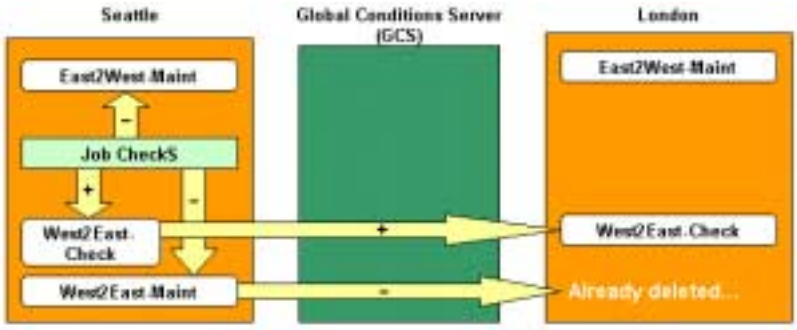
Again, because this condition was already deleted in Seattle, processing is minimal.



5 The cycle begins again. The **CheckS** job is again triggered by its In condition, **East2West-Maint** (this time, not manually).

When the **CheckS** job runs, it

— checks intranet status
— recreates the **West2East-Check** condition, which will trigger the **CheckL** job in London
— deletes the **East2West-Maint** condition locally
— deletes the **West2East-Maint** condition in both Seattle and London, with minimal effect on processing



6 The **CheckL** job is again triggered by its **West2East-Check** In condition, and the cycle continues.

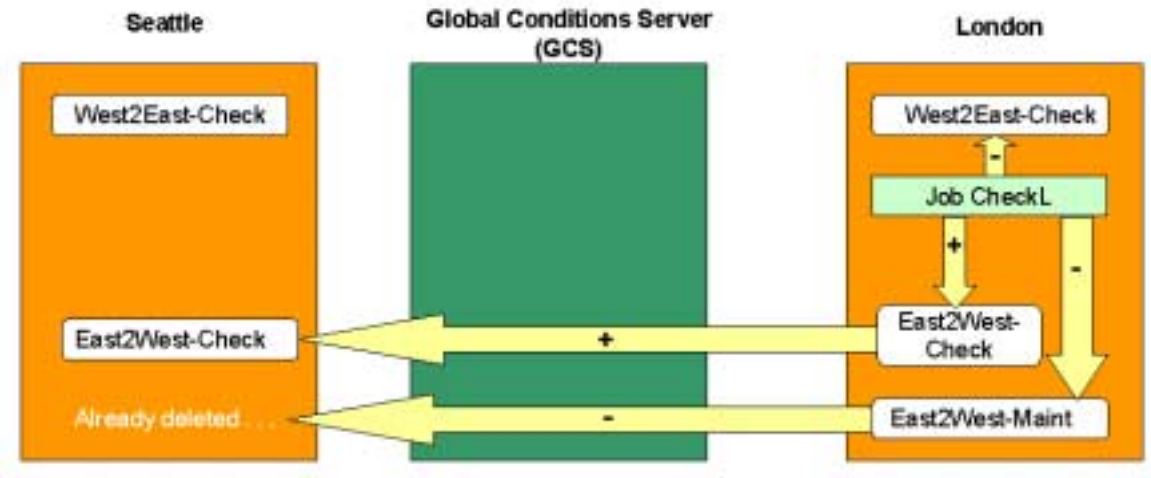
When the **CheckL** job runs, it

— checks intranet status

— recreates the **East2West-Check** condition.

— deletes the **West2East-Check** condition locally

— deletes the **East2West-Maint** condition in both Seattle and London, with minimal effect on processing



7 The cycle is repeated beginning with Step 3 on page 222.

Part 4

Monitoring and intervening in production

This part presents the following topics:

Chapter 17
Introduction to monitoring and intervention 227

Chapter 18
Ensuring Control-M components are communicating 229

Chapter 19
Planning production with Control-M/Forecast 233

Chapter 20
Selecting jobs to monitor 237

Chapter 21
Monitoring and handling alerts 249

Chapter 22
Monitoring and intervening in production 255

Chapter 24
Control-M Self Service management 297

Chapter 25
Service monitoring 311

Chapter 17

Introduction to monitoring and intervention

This chapter presents the following topics:

Monitoring and intervening in production 227
Where to go from here. 227

Monitoring and intervening in production

After you have implemented job scheduling under Control-M, your next task is to ensure that Control-M is up and running, and that jobs are processing as required. Ideally, no intervention should be required, but if intervention becomes necessary, you want to know about it. Because of the sheer number of jobs running in your production environment, you will want to manage the environment by exception; that is, focus on and monitor special critical processes, and potentially problematic situations indicated by user complaints or error messages.

The information provided in this part of the book enables you to perform critical user tasks — monitoring the processing of the jobs in your production environment and intervening and handling problems and issues as necessary.

Where to go from here

NOTE

These guidelines assume that you are already familiar with the information in Part 1 of this book. If you are not, review the instructions for starting and navigating in Control-M/EM in Chapter 2, "Working with Control-M/Desktop and Control-M/EM" before continuing with this part of the book.

Monitoring the production environment and handling or intervening in problems is the subject of the chapters in this part of the book. After familiarizing yourself with the preceding material in this introductory chapter, review the following list, and after you have reviewed this list, proceed to the appropriate chapters.

- To check if Control-M is up and that communication exists between components, see Chapter 18, "Ensuring Control-M components are communicating."
- To select or filter the jobs that you want to monitor, see Chapter 20, "Selecting jobs to monitor."
- To check or handle alerts, see Chapter 21, "Monitoring and handling alerts." An alert is a message indicating that a problem or exception has occurred for a job. Alerts are sent to the Alerts window.
- To check job status summaries and job status details, and perform other monitoring function see "Monitoring" on page 255 (in Chapter 22, "Monitoring and intervening in production").
- To perform bypasses or immediate fixes, see "Intervening" on page 262 (in Chapter 22, "Monitoring and intervening in production").
- To handle batch service management problems, see Chapter 25, "Service monitoring."
- To perform root cause analysis or other analyses in the production environment, see the introductory chapter to Part 5 of this book (Chapter 26, "Introduction to analyzing and optimizing production").

Chapter 18

Ensuring Control-M components are communicating

This chapter presents the following topics:

Communicating with the GUI Server— 229
Automatically reconnecting to the GUI Server 229
Manually intervening in the reconnection process 230
Communicating with Control-M/Servers 230

This chapter describes how to view the communication status between Control-M/EM components and Control-M installations. It also includes instructions for maintaining this communication.

Communicating with the GUI Server—

Control-M/EM must be constantly connected to the GUI Server. The GUI Server handles communication between each Control-M/EM GUI and other Control-M/EM components.

Automatically reconnecting to the GUI Server

As part of Control-M/EM customization (using **Tools => Options**), you normally designate alternative GUI servers in case of GUI Server failure.

If the connection to the GUI Server fails, Control-M/EM displays the Control-M/Enterprise Manager — Reconnect dialog box, and attempts to reestablish connection with an alternate server, beginning with the first designated alternate server. (Depending on site defaults, you might first be prompted to click **Connect**.)

The Control-M/EM — Reconnect dialog box indicates reconnection progress:

- If reconnect with an alternate server is successful, the Control-M/EM GUI continues to function, restoring ViewPoints as desired. The Control-M/EM GUI – Reconnect dialog box closes and a message in the status bar indicates that a communication problem was resolved.
- If Control-M/EM cannot establish a connection with any of the alternate servers, it attempts reconnection with the servers at regular (user-defined) intervals, until the maximum number of allowed retries has been attempted. If a connection still cannot be established, Control-M/EM displays a message notifying you that it is about to shut down.

Manually intervening in the reconnection process

When the Control-M/Enterprise Manager GUI – Reconnect dialog box is displayed, you can

- stop the reconnection process (for example if you are terminating Control-M/EM), by clicking **Stop**
- close the dialog box and terminate Control-M/EM, by clicking **Exit Application**
- display more reconnection process details and options, by clicking **Advanced**

  In the advanced display (that is, if you clicked **Advanced**), to redefine the customization options, first click **Stop**, then click **Settings**. This displays the appropriate Options panel for redefining the settings.

NOTE

This information is intended for the typical Control-M/EM user. If more complicated communication issues arise, contact your Control-M/EM administrator.

Communicating with Control-M/Servers

Control-M/Enterprise Manager (Control-M/EM) depends on a constant flow of information from Control-M/Servers to present you with an up-to-date picture of the status of jobs. Operator requests and global conditions are transmitted back and forth between Control-M/EM and the Control-M server.

The Communication Status dialog box displays the status of communication between each Control-M/Server and the Control-M/EM workstation.

To display the status of communications

In Control-M/EM, choose **Tools => Communication => Status**.

The Communication Status dialog box opens and displays the status of communications. Control-M/EM refreshes the display every two minutes, but you can manually refresh the display at any time.

Each component in the communication path is represented graphically in the Communication Status dialog box, as described in Table 50.

- If a symbol is green, the relevant component is active.
- If a symbol is red, the relevant component is inactive.

Table 50 Communication Status dialog box fields and symbols (Part 1 of 2)

Field	Icon or Value and Description	
Control-M name		Each Control-M/Server has a color-coded indicator: ■ A green check indicates that the Control-M is enabled. ■ A Red X indicates that the Control-M is disabled. When the gateway is restarted, Control-M/EM attempts to communicate with the Control-M.
Gateway		Control-M/EM gateway connection to the Control-M.
Communication		Communication route between the gateway and the Control-M.
Synchronization		Synchronization of the active environment with the Active Jobs file in the Control-M. If red, Control-M/EM is not synchronized with the Control-M.
Network Status	Status of communication between the Control-M/EM workstation and the Control-M. The following statuses can appear in this field:	
	Up	The Control-M is connected and available. (**Note:** Data displayed in the Control-M/EM ViewPoint might not necessarily be synchronized with data in the Control-M Active Jobs file.)
	Reconnecting	The workstation is trying to reconnect to the Control-M.
	Initial	The Active environment is not yet loaded. The workstation is trying to connect to the Control-M.
	Formatting AJF	The Active Jobs file cannot be accessed because either the New Day procedure or Active Jobs File Compress procedure is in progress at the Control-M.
	Downloading	The workstation is receiving a download from the Control-M.
Last Update	Time the last message was sent from a Control-M. This field is displayed in 24-hour clock format.	

Table 50 Communication Status dialog box fields and symbols (Part 2 of 2)

Field	Icon or Value and Description	
Remarks	If the **Synchronization** symbol is not green, this field displays the reason. For example, one possible reasons is	
	Loading Jobs	The Control-M / EM Server is loading jobs from the Control-M / Server database.

To display communication and other information about Control-Ms

In Control-M / EM or Control-M / Desktop, choose **Tools => Communication => Details**.

The Control-M Details dialog box opens and displays data about each Control-M, including status information. Control-M / EM refreshes the display every two minutes, but you can manually refresh the display at any time. You can also filter the display. However, you cannot update the data. (An updatable version called the Communication Administration dialog box is available in the Control-M Configuration Manager facility. For details, see the *Control-M Administrator Guide*.)

Chapter 19

Planning production with Control-M/Forecast

This chapter presents the following topics:

Introduction to Control-M/Forecast 233
Control-M/Forecast integration 234

Introduction to Control-M/Forecast

Control-M/Forecast adds forecasting capabilities to the Control-M suite, letting you estimate your scheduling environment behavior with respect to specific dates in the future. Both graphic and tabular representations of the forecast provide the future dates on which a given job or a table is predicted to be submitted. In addition, Control-M/Forecast generates an estimate of the full production flow for a given future date, as an enterprise-wide view.

Control-M/Forecast is provided as an add-on to a pre-installed Control-M/Enterprise Manager implementation. The product is integrated as options to the Control-M/EM GUI, maintaining the same look and feel.

Control-M/Forecast bases its projections on the data center's new day procedures and user dailies. Control-M/Forecast analyzes tables, user daily jobs, calendars, job dependencies (in and out conditions), time execution windows, Control-M time zone settings, resources and priorities in the Control-M/EM database and, based on existing statistics, estimates how jobs will run on specific days.

For detailed information about Control-M/Forecast, see the *Control-M Business Service Management Solution User Guide*.

Control-M/Forecast integration

Control-M/Forecast features are available directly within Control-M/Desktop. Additional options, buttons, dialog boxes, and menu commands appear after Control-M/Forecast is installed. Table 51 lists these options and their locations.

Additional capabilities and tools provided with Control-M/Forecast include

- Schedule forecast from the job editing form, table editing form and Table Manager in Control-M/Desktop

  The graphical display of the dates on which scheduling definitions are predicted to be submitted can be used as a tool for validating new and existing scheduling definitions. Forecasts are available for jobs, SMART Tables, and Rule-Based Calendars.

- Identify late critical batch services in the forecast, when used with BMC Batch Impact Manager.

- Use What-If scenarios to forecast the effects of potential changes to the scheduling environment.

- Additional reports in Control-M/EM

  Historical reports can help you identify trends of your production environments. You can, for example, learn and understand why your enterprise has missed SLAs. These reports can help you identify and correct main bottlenecks before there is a negative impact on production. For information about forecast related reports see "Control-M/Forecast report types" on page 323.

Control-M/Forecast estimates rely on historical data, fine-tuned by the user.

You can use the util utility to import and export history and forecast information. For details, see the description of the utility in the *Control-M Utility Guide*.

Table 51 Where to look for integrated features in Control-M/Desktop

Feature	Location
validating scheduling definitions graphically for a single job	the Schedule Forecast window, accessed from the Scheduling tab in the job editing form and in the table editing form Specify the scheduling criteria and click one of the following: ■ **Forecast** (in the job editing form) ■ **Calendar Forecast** (in the table editing form) ■ **Table Forecast** (in the table editing form)
validating scheduling criteria graphically for multiple nodes	the Schedule Forecast window, accessed by selecting the nodes in a flow diagram Right-click one of the nodes and choose **Forecast** from the pop-up menu.
validating scheduling criteria graphically for jobs in a table	the Scheduling Manager window, accessed by selecting **Tools => Table Manager** Click **Forecast**.
exporting the scheduling criteria	the Choose Export Type dialog box, accessed by clicking **Export** and specifying the necessary details.
generating a forecast	the Load Forecast dialog box, accessed by selecting **File => Load Forecast**
displaying a Gantt chart of the forecast	the Gantt view, accessed by choosing **View => Gantt**.
identifying potential problems in the job flow	the Forecast Summary window, accessed by choosing **View => Dockable Windows => Forecast Summary**
quickly identifying critical batch services that will be late	the Forecast Service Monitor window, accessed by choosing **Tools => Forecast Service Monitor**
forecasting the effects of potential changes to the scheduling environment	apply a What-If Scenario to a forecast, by choosing **File => Open=>Scenario** Select the name of a pre-defined scenario and choose **Actions => Run Forecast**.
generating historical reports to identify trends of the production environment	See "Control-M/Forecast report types" on page 323.
increasing forecast accuracy by refining statistics collection definitions	See Chapter 11, "Setting up definitions for periodic statistics collection."

For information about using these features, see the *Control-M Business Service Management Solution User Guide*.

Chapter 20

Selecting jobs to monitor

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Introduction

Job processing problems are the exception, not the rule, and it is the exceptions that you want to monitor. By limiting the active environment jobs that you load and display in the Control-M/Enterprise Manager window to those jobs that appear problematic, you simplify job monitoring and significantly reduce processing overhead. The mechanisms described in this chapter provide this functionality:

- ViewPoints — a ViewPoint consists of a number of referenced subcomponents whose combined criteria determine which jobs will be selected and loaded into memory, how the jobs will be filtered, and the hierarchy that will be used to display those jobs. ViewPoints consist of the following subcomponents:

  — Collection — selects which jobs are loaded from the active environment into memory, based on parameter values in the job processing definition. Reducing the number of jobs loaded to memory decreases system overhead and clutter.

  — Global Filter — determines which loaded jobs are displayed in the ViewPoint. Filtering can be very useful for managing by exception. For example, you can filter to display only those jobs that ended Not OK and jobs in a Wait status. Though they do not reduce system overhead, filters do reduce screen clutter,

enabling you to focus on jobs that really require monitoring. Each ViewPoint has an associated Global filter, but while a ViewPoint is displayed, you can select a different Global filter to alter which jobs are displayed in the current ViewPoints session. Once defined, Global filters are available site-wide.

— Hierarchy definition — defines the hierarchical structure used to display jobs.

Control-M/EM comes with a set of predefined ViewPoints, but you can define your own ViewPoints.

- Dynamic filters — a Dynamic filter can be used to further filter which loaded jobs get displayed in the ViewPoint. Like Global filters, dynamic filters do not reduce system overhead, but they do reduce screen clutter, and facilitate monitoring by exception. Dynamic filters are defined locally on an on-need basis, and can be saved for reuse.

Selecting a ViewPoint

You can open multiple ViewPoints at the same time in separate windows.

To display an existing ViewPoint

1 In the **Control-M/Enterprise Manager** window, choose **File => Open Viewpoint** or click .

2 In the **Open ViewPoint** dialog box, select the ViewPoint and click **OK**.

Displaying nodes in their own ViewPoint

Select the nodes in the ViewPoint, and choose **View => View Selection**.

A new, special ViewPoint opens, displaying the selected nodes.

When you display selected nodes in their own special ViewPoint, the ViewPoint is similar to regular ViewPoints, but because it is based on a fixed set of nodes

- you cannot filter the ViewPoint
- you can not remove jobs from, or add jobs to, the ViewPoint

Filtering the ViewPoint display

Two types of filters can be used to filter the display, Global filters and dynamic filters. These filters differ in several ways, including how they are defined. For details, see

- Switching filters
- Defining dynamic filters
- Defining global filters

Switching filters

This section describes how to switch global filters and how to filter with dynamic filters.

To switch global filters

In the Filter list box in the ViewPoint toolbar, select the global filter name.

The selected filter replaces the assigned filter in the current session only; the ViewPoint's permanent filter assignment remains unchanged.

To filter with a dynamic filter

1 Depending on your current location, perform one of the following:

- If the **Open ViewPoint** dialog box is currently displayed (that is, you are in the process of opening a ViewPoint), after you select the ViewPoint click **Dynamic Filter**.
- If the ViewPoint is currently displayed, choose **<Dynamic Filter>** in the Filter list box.

The **Dynamic Filter Definition** dialog box displays the last-used dynamic filtering criteria.

2 To use a different dynamic filter, select the name of the filter in the Filter Presets field and click **OK**. To create a new dynamic filter or edit the displayed filter definition, follow the instructions in "Defining dynamic filters" on page 240.

TIP

After you have defined a dynamic filter for a ViewPoint, if you click **Dynamic Filter** when opening the Open ViewPoint dialog box, this dynamic filter definition is redisplayed (until you clear this filter definition), even if you subsequently selected a different filter from the filter selection list.

To clear the dynamic filter definition, click **Clear** in the Dynamic Filter dialog box.

Defining dynamic filters

A dynamic filter is a filter that you define locally as you need it. You can then discard it or save it for reuse.

To define a dynamic filter

1 If the **Dynamic Filter Definition** dialog box is not currently displayed, display it by performing one of the following tasks (whichever is appropriate):

- If the **Select ViewPoint** dialog box is currently displayed (that is, you are in the process of opening a ViewPoint), after you select the ViewPoint, click **Dynamic Filter**.
- If the ViewPoint is currently displayed, select **<Dynamic Filter>** in the Filter list box.

The **Dynamic Filter Definition** dialog box displays the last-used dynamic filtering criteria.

2 To edit an existing filter, select it in the Filter Presets field and click **OK**. To create a new filter, specify a name for it in the Filter Presets field.

3 Fill in filtering criteria.

TIP

To clear displayed criteria, click **Clear** at the bottom of the dialog box.

Consider the following when filling in filtering criteria:

- Most fields are self-explanatory. If you need a description of the fields that correspond to fields in the job editing form, see the *Control-M Parameter Guide*.

- The **LIKE** operator is used for all text fields except the **Odate**, **Start Time**, and **End Time** parameters. For **Odate From**, **Start Time From**, and **End Time From**, the >= operator is used. For **Odate To**, **Start Time To**, and **End Time To** the <= operator is used.

- For **Odate From** and **Odate To**, use the *YYMMDD* format. For **Start Time** (**From** and **To**) and **End Time** (**From** and **To**), use the *YYYYMMDDhhmm*ss format.

- Fields can contain several criteria separated by commas (for example, **Control-M = A*,B***).

- The **Job Status** and **TaskType** fields each have a button (...) that, when clicked, opens an appropriate dialog box (with relevant check boxes):

  — You can select all check boxes, by clicking .

  — You can clear all check boxes by clicking .

NOTE

- If you do not select any check-boxes, all options are loaded.
- Do not select both **Emergency** and **Critical**, or no jobs will be displayed.
- Task type for z/OS jobs can correspond to the following fields of UNIX jobs: **Task Type**, **Cyclic** and **Emergency**. To correctly filter on certain task types for z/OS jobs, specify the desired states (for example, Cyclic or Critical) along with the desired task type. For example, to filter for Cyclic Jobs, select **Cyclic Only** in the main dialog box and **Job** in the Task Type dialog box.

- For BMC Batch Impact Manager users: Check the **Included in Business Service** check box to filter on jobs belong to a critical batch service.

4 To save this definition for later reuse, click .

To save with a different name, type the new name in the Filter Presets field before clicking .

NOTE

- Dynamic filter definitions are stored locally. The default storage location is under the user profile directory (which can be configured differently using the Environment-General panel of the Options dialog box), and each definition is stored in its own file. Only users with access to the computer on which a filter is saved can access and use that filter.

Defining global filters

A global filter is a filter definition, accessible by all users, that determines which jobs are displayed in the ViewPoint.

To define a global filter

1 In Control-M/Enterprise Manager, choose **Tools => ViewPoint Manager**.

2 Perform one of the following actions:

- To edit an existing global filter definition, select the filter name under the **Filters** node and click **Edit**.
- To create a new global filter definition, select the **Filters** node and click **New**. Then, in the Filter dialog box, enter a name for the filter and click **OK**. (Filter names are not case sensitive.)

The **Filter Definition** dialog box is displayed.

Figure 14 Filter Definition dialog box

3 In the **Filter Definition** dialog box, do the following:

A Optionally, define a description for the filter.

B Define the filtering criteria:

- To add a set of criteria, select or specify a field name, relational operator, and a value (for example, **CTM Name = ctmp1**). Then add it to the Include or Exclude criteria area.
- To modify an already added set of criteria, select it in the Include or Exclude area and then edit it in the Edit area.
- To delete a set of criteria, select it in the Include or Exclude area and click delete.

4 Click **OK**.

NOTE

You can define up to four sets of filtering criteria in a filter. Multiple criteria combine using a Boolean OR relationship—all jobs that satisfy at least one of the Include or Exclude criteria are included or excluded accordingly.

Defining ViewPoints

A ViewPoint builds a view of the active environment by retrieving and displaying data according to the criteria defined in the ViewPoint's collection, hierarchy, and global filter definitions.

- Collections determine the jobs to be loaded into memory.
- Global filters determine which jobs to display.
- Hierarchies determine the hierarchical structure in which to display jobs.

EXAMPLE

An example hierarchy is: Control-M, application, group

Control-M/EM is supplied with a number of predefined ViewPoints, but you can create or modify definitions.

To define a ViewPoint

NOTE

If your new ViewPoint definition will require new collection, global filter or hierarchy definitions, create them before defining the ViewPoint; you cannot create them while defining the ViewPoint.

1 In Control-M/Enterprise Manager, choose **Tools => ViewPoint Manager**.

2 In the **ViewPoint Manager** dialog box, do one of the following:

- To create a new ViewPoint definition, select the ViewPoints node and click **New**. Then, in the **ViewPoint** dialog box that opens, enter a name for the ViewPoint.
- To edit an existing ViewPoint definition, select the definition under the ViewPoints node and click **Edit**.

3 In the **ViewPoint Properties** dialog box, do the following:

A Enter a description for the ViewPoint (optional).

B Select a collection for the ViewPoint. To edit the selected collection, click **Edit**, and follow the relevant steps in the procedure "Defining the set of jobs to load to memory (collections)" on page 244.

C Select a global filter for the ViewPoint. To edit the selected filter, click **Edit**, and follow the relevant steps in the procedure "To define a global filter" on page 242.

D Select a Hierarchy definition for the ViewPoint. To edit the selected Hierarchy, click **Edit**, and follow the relevant steps in the procedure "To define a hierarchy" on page 246.

E After selecting the hierarchy, select the **Initial Level of the Hierarchy** to display when the ViewPoint is opened.

By default, the highest hierarchy level nodes are displayed in when the ViewPoint is opened.

F Click **OK**.

Defining the set of jobs to load to memory (collections)

A collection defines criteria that determine which jobs in the enterprise are loaded into memory. Jobs are selected when the values in their job processing definitions match the criteria specified in the collection definition.

To define a collection

1 In Control-M/Enterprise Manager, choose **Tools => ViewPoint Manager**.

2 In the ViewPoint Manager dialog box, do one of the following:

- To edit an existing collection definition, select the collection name under the **Collections** node and click **Edit**.
- To create a new global filter definition, select the **Collections** node and click **New**. Then, in the Collection dialog box, enter a name for the collection. (Collection names are not case sensitive.)

3 In the Collection Definition dialog box define sets of criteria that should be used to include or exclude matching jobs, as follows:

A In the Edit area, select a Field in the first column, a relational operator in the second column, and select or specify a value in the third column.

B Click **Add** next to the Include or Exclude area, depending on how the criteria should be applied.

When filling in the selection criteria, keep in mind the following:

- Many fields correspond to fields in the job editing form. If you need a description of the fields, see the *Control-M Parameter Guide*.
- The **LIKE** operator treats ***** and **?** characters specified in the value as wildcards; the **=** operator treats ***** and **?** characters specified in the value as literals.
- For each field, you can specify several criteria separated by commas (for example, **CTM Name= A*,B***). The implied relationship is OR.

NOTE

- Do not select both **Emergency** and **Critical**, or no jobs will be displayed.
- Task type for z/OS jobs can correspond to the following fields of UNIX jobs: **Task Type**, **Cyclic** and **Emergency**. To correctly filter on certain task types for z/OS jobs, specify the desired states (for example, Cyclic or Critical) along with the desired task type. For example, to filter for Cyclic Jobs, select **Cyclic Only** in the main dialog box and **Job** in the Task Type dialog box.

4 To delete an entry, select it and click **Delete**.

5 When done, click **OK**.

Defining the display hierarchy

A hierarchy determines how selected jobs are displayed. The default hierarchy is: Control-M – Application – Group Name. You can define other hierarchies in the Hierarchy Definition dialog box.

To define a hierarchy

1 In Control-M/Enterprise Manager, choose **Tools => ViewPoint Manager**.

2 Perform one of the following:

- To edit an existing hierarchy definition, select the filter name under the Hierarchies node and click **Edit**.
- To create a new hierarchy definition, select the Hierarchies node and click **New**. Then, in the Hierarchy dialog box, enter a name for the hierarchy. (Hierarchy names are not case sensitive.)

3 In the Hierarchy Definition dialog box:

A Optionally, define a description for the hierarchy.

B Select criteria for each level of the hierarchy. You can define up to four hierarchy levels.

4 Click **OK**.

TIP

- To return to the default hierarchy, click **Default Levels**.
- To clear fields and reset levels, click **Reset Levels**.

Alternative method for defining ViewPoints — the ViewPoint wizard

As an alternative to defining ViewPoints, hierarchies and filters from the ViewPoint Manager, you can define ViewPoints (and their accompanying hierarchies and filters) using the ViewPoint Wizard.

To define a ViewPoint using the ViewPoint wizard

In Control-M/EM, choose **File => New ViewPoint** or click and work through the displayed ViewPoint Wizard pages.

Most wizard pages are self-explanatory. For general details regarding the definition of collections, global filters and hierarchies, see “Defining the set of jobs to load to memory (collections)” on page 244, and “Defining the display hierarchy” on page 245 respectively.

NOTE

When defining hierarchies and global filters using the ViewPoint wizard

- if you define a new hierarchy but do not specify a name for it, the name defaults to the ViewPoint name with **Hier** appended to it
- if you are define a new global filter but do not specify a name for it, the name defaults to the ViewPoint name with **Filt** appended to it

Chapter 21

Monitoring and handling alerts

This chapter presents the following topics:

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Connecting to the Global Alerts Server 250
Displaying alerts. 250
Working with alerts 251

Introduction

An important way to monitor your production environment is to monitor alerts. An alert is a message that indicates that a problem or exception has occurred for a job.

Alerts are monitored and handled from the Alerts window, which must be connected to a Global Alerts Server (GAS).

Alerts can originate from any of the following:

- Shout facility — a job processing definition can include instructions in the Shout or Do Shout parameter to send a message to the Alerts window.
- Jobs ending not ok — two system parameters, **AlertOnAbend** and **DownCreAlerts**, can automatically generate alerts when a job terminates with an **Ended not OK** status.
- A communication breakdown (for example, between Control-M and Control-M/EM) will generate an alert.
- BMC Batch Impact Manager, which can be used to relay messages of special importance. For more information, see the *Control-M Business Service Management Solution User Guide*.

You can only view alerts for those jobs that you are authorized to view.

NOTE

You can customize default settings for the alerts feature in the **Alerts** panel of the Control-M/EM GUI **Options** dialog box. For details, see Appendix A, "Customizing the interfaces."

Connecting to the Global Alerts Server

1 In the Alerts window, choose **File => Connect**.

2 In the Connect to Global Alerts Server dialog box, select a GAS server.

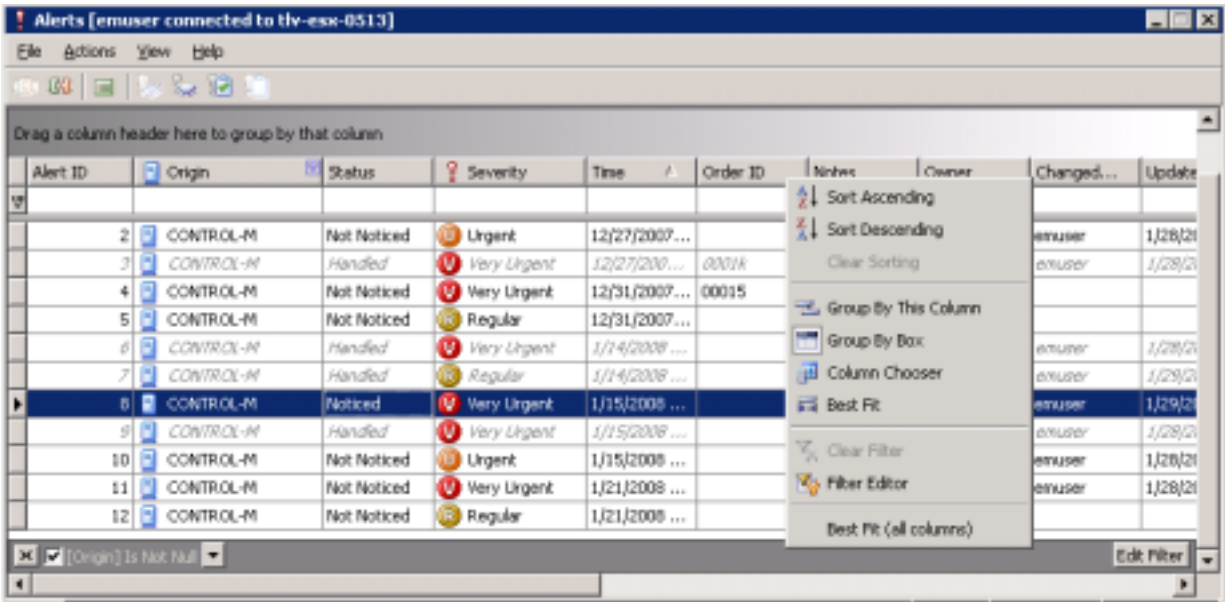
3 Click **Connect**.

4 Optionally, to disconnect from the Global Alerts Server, in the Alerts window, choose **File => Disconnect**.

Displaying alerts

1 In the Control-M/Enterprise Manager window, choose **View => Alerts**. The Alerts window opens and displays the alert data.

Figure 15 Alerts Window



2 Optionally, to filter information in the Alerts window, perform one of the following:

- Click on the right top corner of a column header and select a filtering option.
- Right-click on any column header and choose **Filter Editor**. Use the Filter Builder to enter advanced filtering criteria.

3 To set display preferences (for example, always displaying the Alerts window on top), choose the appropriate option in **View** menu.

Working with alerts

The Alerts window is used to view the alert's status and severity (urgency) according to the **Shout – Urgency** parameter in the job processing definition.

Alerts first appear in the Alerts window with a status of **Not Noticed**. As you examine and work with the alerts, you can change their status. Alerts that are being handled are indented and grayed.

The Alerts facility enables you to attach notes to alerts. For example, you might want to attach a note indicating the name of the person assigned to handle the alert.

You can also open an alert into a local ViewPoint, which can help you examine and analyze the job that prompted the alert and its work environment. This can help you trace the cause of the problem and troubleshoot it. You can open multiple local ViewPoints.

NOTE

To perform the actions explained below you must be connected to the relevant Gateway (for example, to update the alert status and severity).

To display alerts with severity identifying colors

In the Alerts window, choose **View => Color Scheme => Old Scheme.**

To display the details of a particular alert (opening the Alert Details dialog box) either:

- In the Alerts window, select the alert and choose **Actions => Properties**.
- Double-click on the alert information.

To change the status of an alert

In the **Actions** menu of the Alerts window, choose the appropriate status as follows:

- To indicate that you've noticed but not necessarily handled the alert, choose **Notice**. (To change the status back to **Not Noticed**, choose **Unnotice**.)
- To indicate that you've handled the alert, choose **Handle**. (To change the status from **Handled** to **Unhandled**, choose **Unhandle**.)

To change the urgency of an alert

1 In the Alerts window, select the alert and choose **Actions => Properties**.

2 In the Alert Details dialog box, select the urgency in the **Severity** field and click **OK**.

To find and focus on the job that produced the alert in the Flow Diagram

In the Alerts window, select the alert and choose **Actions => Find Job**.

The relevant node is displayed and selected in the Control-M/Enterprise Manager ViewPoint window.

To add a note to an alert

1 In the Alerts window, select the alert and choose **Actions => Properties**.

2 In the Alert Details dialog box, type the note in the **Note** field click **OK**.

To export the list of alerts to a csv file

In the Alerts window, choose **File => Export**. In the displayed dialog box, provide a path, file name, and a file type of **.csv**, and click **Save**.

To print the list of alerts

In the Alerts window, choose **File => Print**. Then, in the Print dialog box, provide the print details and click **Print**.

To open an alert into a Local ViewPoint

In the Alerts window, select the alert and choose **Actions => Properties => Open into Viewpoint**.

A new ViewPoint is displayed in the GUI. This ViewPoint contains the job node of the job that prompted the selected alert. In addition, job nodes of jobs that depend on or are predecessors for the job are also shown in this ViewPoint.

NOTE

- You cannot use this function for an alert with an empty Order ID.
- If the job that prompted the selected alert is no longer in the Control-M/EM environment, an empty ViewPoint is displayed.
- Depending on the setting of the option Open into Local View area, certain nodes might not be displayed in the ViewPoint. For details and instructions on changing the setting, see the description in Table 77 on page 363.

Chapter 22

Monitoring and intervening in production

This chapters presents the following topics:

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- Checking job status summaries by Control-M, application, and group 256
- Checking job status details 256
- Performing job monitoring actions 257
- Checking predecessor and successor job flows 258

Intervening 262
- Viewing and editing the details of a job in the active environment 262
- Performing manual job intervention 265
- Handling errors that occur when you intervene 270
- Manually indicating satisfied conditions 270
- Manually rescheduling jobs in the active environment 272
- Activating third-party applications 275

Control-M/EM provides you a number of ways to monitor job processing in the active environment, and a number of ways to manually intervene in the job processing.

Monitoring

Control-M/EM provides a number of methods for monitoring job processing. For example

- The Alerts facility can indicate problems in the Alerts window. For details, see Chapter 21, “Monitoring and handling alerts.”
- Shout statements defined in job processing definitions can notify you (for example through the console or through email) of job processing statuses or problems.

- SNMP traps defined in DO SNMP statements in job processing definitions can indicate problems to other applications. For details, see the *Control-M Administrator Guide*.

- You can use the Service Monitor window to monitor the overall processing flow of jobs that constitute critical batch services. If you have the BMC Business Impact Manager add-on installed, you can monitor critical jobs for mission critical operations. For details, see Chapter 25, "Service monitoring."

This section describes various methods for monitoring job processing from the Control-M/Enterprise Manager window.

Checking job status summaries by Control-M, application, and group

For selected high level nodes, such as Control-M, application, or group, you can display status summaries for the jobs in that node.

To see a summary of job statuses in a high-level node

In the Control-M/EM window, right-click the node in the flow diagram or navigation tree, and in the pop-up menu, choose **Status Summary.**

The General tab of the Status Summary dialog box displays, color-coded by status, the number and percentage of jobs in the node with the status. It also displays totals and the number of tables and Sub-tables included in the totals.

If you selected a Control-M/Server node, an additional panel (Control-M) provides basic details about the Control-M, and the following communication information:

- **Sync** — indicates if the current display is synchronized with the Control-M Active Jobs file.

- **Refresh needed** — indicates if the **Refresh Needed** button in the Control-M/EM window should be clicked to display recently forced or ordered jobs.

Checking job status details

To help you analyze jobs and manage job flows, you can display and modify the processing details of jobs in the active environment. You can also modify certain details for that job run. For instructions and additional information, see "Viewing and editing the details of a job in the active environment" on page 262.

Performing job monitoring actions

You can perform various job monitoring actions on jobs displayed in the Control-M/EM ViewPoint. Regardless of the action, the process for performing the action is basically the same.

NOTE

To perform job actions, you must have appropriate authorizations in Control-M/EM and the relevant Control-M.

To perform a job monitoring action

Right-click the job node in Control-M/EM, and in the pop-up menu, choose the action option. The pop-up menu lists both monitoring and intervention actions. Table 52 on page 257 summarizes the monitoring actions you can perform on jobs in the active jobs file.

Control-M/EM accesses and updates the relevant Control-M server database.

NOTE

Actions are disabled when communication is not synchronized.

Table 52 Job monitoring actions (Part 1 of 2)

Action	Option
identify the maximum runtime for a series of jobs and list the dependent job nodes in the longest path. For details, see "To display the details of a Critical Path dependency" on page 259.	Critical Path
view the job's documentation.	Documentation
for a selected job, identify the predecessor jobs that failed to run **OK**. This feature can help you determine why a selected job or SMART Table failed to run as expected. For details, see "To display the details of a job's predecessors that failed" on page 260.	Enhanced Why
view log messages for the job in the Job Log dialog box.	Log
identify the predecessor or successor jobs of a selected job. For details, see "Identifying predecessor and successor jobs" on page 42.	Neighborhood
view statistics of the job's latest runs.	Statistics
view the job's JCL or job script statements.	View JCL/Script

Table 52 Job monitoring actions (Part 2 of 2)

Action	Option
view the job's SYSOUTs. In the displayed dialog box, select the SYSOUT to view, and click OK. **Note:** For z/OS, this option is available only if Control-M/Restart is installed in the Control-M. **Note:** If the SYSOUT size exceeds the size limit defined for the Control-M during installation, the SYSOUT cannot be viewed.	View Sysout List
view why the job has not yet been executed (and intervene as needed). Results are displayed in the Why dialog box. For instructions, see "To view why a job has not begun execution and to intervene if necessary" on page 269	Why

Checking predecessor and successor job flows

In Control-M/EM, you can identify and gather details about the following predecessor and successor job situations:

- Predecessor and successor jobs of a job (Neighborhood)—For details, "Identifying predecessor and successor jobs" on page 42.
- Identify the maximum runtime for a series of jobs and list the dependent job nodes in the longest path. (Critical path)—described in this section.
- Predecessor jobs (of a selected job) that failed to run **OK** (Enhanced Why)—described in this section.

After you have generated the list of jobs and displayed their details, you can perform a number of other operations (for example, exporting the list).

NOTE

To navigate directly to a predecessor or successor node without generating detail lists, do the following:

1. In the job node's pop-up menu, choose **Branch Menus** and then **Predecessor** or **Successor**.
2. In the submenu, select the target node.

To display the details of a Critical Path dependency

1 In the flow diagram, expand all relevant group nodes so all jobs to be included in the critical path are visible.

2 Select the first and last nodes in the path in the flow diagram. The last node should be a descendant of the first node, but not immediately below it.

3 In the **Analysis** menu, select **Critical Path**.

4 In the Critical Path dialog box

- in the Use area, select the measure to be used to calculate the critical path — **Average Runtime** or **Last Runtime**
- you can specify an **Overlapping Tolerance**, in seconds

  This represents the maximum time, in seconds, that the end of one job can overlap the start of the subsequent job, which impacts critical path calculation.

NOTE

Jobs that do not have runtime statistics have an expected runtime of 0, and are not factored into the critical path calculation.

5 Click **Find Path**.

The number of nodes in the path and the total runtime for the path are displayed in the dialog box.

The number of job nodes in the critical path is listed in the dialog box, and those job nodes are selected in the flow diagram. A display area opens at the bottom of the dialog box and displays the Details list, which is a list of those jobs and their details (for example, current status, order ID, RBA). For a summary of actions you can perform in the dependency Details list, see "Working with predecessor and successor job details (Details list)" on page 261.

TIP

If the details display area does not open, click **Details**, which alternately displays or hides this display area.

To display the details of a job's predecessors that failed

1 In the flow diagram or the navigation tree, select the relevant job or SMART Table node.

Ensure that the selected job or SMART Table has In conditions and is in Wait status (that is, it has not yet run).

2 In the **Analysis** menu, select **Enhanced Why**.

3 In the Enhanced Why dialog box, click the appropriate button.

- To display all predecessor jobs and SMART Tables that did not end or did not end OK, click **With path**.
- To display the oldest predecessor job or SMART Table that did not end or did not end OK, click the **Without path** button.

The predecessor jobs that failed to run OK are highlighted in the flow diagram.

4 Click **Find**.

The number of predecessor jobs that failed to run OK is listed in the dialog box, and those predecessor jobs are selected in the flow diagram. A display area opens at the bottom of the dialog box and displays the Details list, which is a list of those jobs and their details (for example, current status, order ID, RBA). For a summary of actions you can perform in the dependency Details list, see "Working with predecessor and successor job details (Details list)" on page 261.

TIP

If the details display area does not open, click **Details**, which alternately displays or hides this display area.

Working with predecessor and successor job details (Details list)

While the Details list is displayed in a Critical Path or Enhanced Why dialog box, you can perform the following tasks on that list:

Task	How to
display or hide an Item Count at the bottom of the Details list	Click **Item Count** in the pop-up menu for any job listing.
locate a listed job in the flow diagram	Click **Find** in the pop-up menu for the job listing.
open the job editing form for a listed job	Double-click the job listing.
export the details of the listed jobs to a comma-delimited (CSV) file	Click **Export to File** in the pop-up menu for the job listing.
create (and view) a text report containing the details about the listed jobs	Click **Create Report** to save this information as a file. (To open the saved report in your default text editor, click **Show Report**.)
display the listed jobs in their own ViewPoint	Click **Open ViewPoint**. For more information, see "Properties of ViewPoints based on dependent jobs."

Properties of ViewPoints based on dependent jobs

When you display the jobs listed in the Detail list in their own ViewPoint, the ViewPoint has the following special properties:

- (For Neighborhood dependencies) The job on which the Neighborhood action was performed is highlighted.
- You cannot change the filter on the new ViewPoint.
- Changes made to the original ViewPoint are reflected in the new ViewPoint (but in the case of Enhanced Why, the Enhanced Why search is not recalculated).
- Deletion of a job in the original ViewPoint is reflected in the new ViewPoint, but
  - — for Neighborhood dependencies, jobs are not added to this ViewPoint
  - — for Enhanced Why dependencies, jobs that are connected to the deleted job are not deleted
- Additional Neighborhood, Enhanced Why, and Critical Path functionality is enabled in the new ViewPoint.

- The **Refresh Needed** button functions as in any ViewPoint, but in the case of Neighborhood dependencies no jobs can be added to or deleted from the new ViewPoint.
- The hierarchy of the new ViewPoint is inherited from the original ViewPoint.

Intervening

The Control-M/Enterprise Manager window provides you a number of ways to intervene in job processing if necessary.

Viewing and editing the details of a job in the active environment

When a job processing definition is ordered or forced (through New Day processing or manually), a modified copy of the original definition is placed in the active jobs file. To help you analyze jobs and manage job flows in Control-M/EM, you can display and modify the processing details of the job in the active environment.

To display (and update) the details of a job in the active environment

1 In Control-M/EM, place the job processing definition in Held status by right-clicking the node and choosing **Hold**. (You can skip this step if you will only be viewing, but not updating, the details).

Smart Tables and Sub-tables can also be placed in Held status and all jobs belonging to the table will be held.

NOTE

To update details, you must perform a Hold on the job in the active environment before opening the job editing form, and Free the job when you have finished the updates.

2 Double-click the job node.

The job editing form displays the job processing definition. The Active tab displays details unique to the job order in the active environment.

3 Edit the job processing definition as needed. For an explanation of how to edit the job processing definition, see Chapter 4, “Defining how jobs should run.” Keep in mind the following points:

- You are working on a copy of the original. Any changes you make apply only to the current copy you are editing. They do not apply to the original or to any other copies that might appear in the active jobs file.

- Not all pages or parameters that appear in the original appear in the active jobs file copy. For example, because the job is already scheduled, the Scheduling tab parameters are unnecessary and this tab does not appear.

- Conversely, after a job is scheduled, certain required parameters are generated during job processing. These do not appear in the job editing form that you define in Control-M/Desktop, but are displayed in a panel in the job editing form that is unique to Control-M/EM—the Active tab. Furthermore, some variables and AutoEdit parameters might display their resolved values.

- Changing certain parameters will not provide any benefit. Be cautious and be sure of the benefit before deciding to edit parameters. You might find it useful to edit parameters in the Active, Set, Step, or PostProc pages if a job is not being submitted or if there is a need for modified post-processing. It might also be useful to edit parameters before a rerun or cyclic run.

- Table 53 describes parameters in the Active tab, many of which are unique to copies of the job processing definition in the active environment. For tips in modifying job details, see "Creating and editing jobs" on page 83. For a detailed description of the fields displayed in the job editing form, see the *Control-M Parameter Guide*.

4 Click **Save**.

5 Right-click the node and choose **Free** to free the job.

To order or force the job (again), see "To order or force jobs" on page 272.

Table 53 Fields of the Active tab (Part 1 of 3)

Section	Field	Description
Job Details	**Order ID**	Unique job order ID in Control-M.
	Job ID	ID assigned to the job by the operating system.
Run Time	**Current Status**	Status of the job, such as **Ended OK**.
	Held	Indicates if the job is held.
	Deleted	Indicates if the job is deleted.
	Restarted	**z/OS only:** Indicates if the job has been restarted.
	Order Date	Original scheduling date of the job.
	Next Time: (Date / Time)	Indicates the next expected submission date and time for the job, for rerun or cyclic jobs that use the Interval option. For z/OS jobs, only the time is specified.
	Rerun counter	Number of times the job has been rerun.

Table 53 Fields of the Active tab (Part 2 of 3)

Section	Field	Description
Additional Info	**Sysout search count**	**z/OS only:** Number of times Control-M has looked for the job.
	NJE Node	**z/OS only:** Node ID of the NJE terminal.
	NJE	**z/OS only: 1** indicates that the job was sent for execution to a computer that is connected to Control-M through NJE (the node does not share a spool with Control-M).
	Logical Partition	**z/OS only:** For Control-M for z/OS version 6.2.00 and later: Logical partition where the job is running.
	Must end by	**z/OS only:** Time by which the job must finish executing.
		+ *num* Days – The day by which the job must finish executing. The **+ *num* Days** subparameter is relevant only for jobs running in Control-M for z/OS version 6.2.00 or later.
	Elapse	**z/OS only:** Length of time (in minutes) that the job is expected to run.
	Due In	**z/OS only:** Time at which the job must start executing.
		+ *num* Days – The day on which the job must start executing. The **+ *num* Days** subparameter is relevant only for jobs running in Control-M for z/OS version 6.2.00 or later.
	Job Name	**z/OS only**: Name of the job.
	Start Time	Date and time the job began executing.
	End Time	Date and time the job finished executing.
	Average Run Time	Average time (in hhmmss format) for the job to run, based on the last successful runs of the job.
	Standard Deviation	Standard deviation from the average runtime. This statistic is compiled from the last successful runs of the job.
	From Step	**z/OS only** with Control-M/Restart: Step from which to rerun the job.
	From Proc	**z/OS only** with Control-M/Restart: Procedure step from which to rerun the job.
	To Step	**z/OS only** with Control-M/Restart: Step until which to rerun the job.
	To Proc	**z/OS only** with Control-M/Restart: Procedure step until which to rerun the job.
	Highest RC	**z/OS only:** The highest return code from among all the steps of the job in C*nnnn* format. This value includes both the steps ended NOTOK and the steps ended OK. If any steps ended abnormally, the first ABEND Code, either in S*xxx* or U*xxxx* format, is saved as the highest return code. See the *Control-M Parameter Guide* for further information about return codes for z/OS jobs.

Table 53 Fields of the Active tab (Part 3 of 3)

Section	Field	Description
	Highest RC Step	**z/OS only:** The name of the job step that generated the highest return code (Highest RC described above).
	Highest RC Proc	**z/OS only:** The name of the job procedure step that generated the highest return code (Highest RC described above)**.**
	Highest MEMNAME	**z/OS only**: For SMART Tables only. The name of the job member that generated the highest return code from among all jobs of the SMART Table (i.e. jobs within a SMART or Sub-table).
	Failure RC	**z/OS only:** The highest return code in the job execution from among the steps that ended NOTOK because of high return codes. The abended step(s) and steps that ended OK are not considered for the resolution of this variable. For jobs ended OK, this variable resolves to blanks. See the *Control-M Parameter Guide* for further information about return codes for z/OS jobs.
	Failure RC Step	**z/OS only:** Job Step name which generated the Failure Return Code (Highest RC described above)
	Failure RC Proc	**z/OS only:** Job Procedure Step name which generated the Failure Return Code (Failure RC described above).
	Rule Based Calendar	Name of RBC that ordered job.

Performing manual job intervention

You can perform various intervention actions on jobs displayed in the Control-M/EM ViewPoint. Regardless of the action, the process for performing the action is basically the same.

NOTE

To perform job actions, you must have appropriate authorizations in Control-M/EM and the relevant Control-M.

To perform an intervention action on a job

Right-click the job node in Control-M/EM, and in the pop-up menu, choose the action option. The pop-up menu lists both monitoring and intervention actions. Table 54 on page 266 summarizes the intervention actions you can perform on jobs in the active jobs file.

Control-M/EM accesses and updates the relevant Control-M server database.

NOTE

Actions are disabled when communication is not synchronized.

Table 54 Job intervention actions (Part 1 of 2)

Intervention	Menu option
hold (stop processing) the job. You must hold the job before you update its details in the job editing form in the active jobs file. **Note:** ■ If the job has not started to execute, Hold prevents it from executing even after all submission criteria are satisfied. ■ If the job is executing, Hold stops its execution but the job maintains its **Executing** status. ■ If the job has completed executing, while it is Held it cannot be manually rerun. The job remains in this state until you release it using the **Free** option.	Hold
free (resume the processing of) the job. If you held a job, you must free it before processing can resume.	Free
activate third-party applications. For details, see "Activating third-party applications" on page 275.	Activate Application
specify criteria and resources to be ignored. For instructions, see "To bypass selected submission criteria" on page 267.	Bypass
confirm that Control-M should process a job that requires manual confirmation (that is, the job has a **Wait User** (pink) status).	Confirm
delete the job. (This action does not physically delete the job; it only changes the job status to Deleted. The job remains visible in the active jobs file until the next cleanup of the Active Jobs file by the New Day procedure or manual request. Until then, you can undelete the job.)	Delete
undelete a deleted job that still appears in the active jobs file.	Undelete
edit the job's JCL or job script statements. **Note:** ■ You cannot edit lines that contain over 200 characters. ■ You cannot edit scripts for SAP jobs. ■ To edit a job script in UNIX, you must be identified in the computer's **/etc/passwd** file.	Edit JCL / Script
change the job's status to **Ended OK** (and the color of the job node to green.) Available for jobs with a status of **Ended Not OK** or for jobs in a **Wait** status (such as **Wait Time** or **Wait Cond**). **Note**: For jobs running under Control-M for z / OS, **Force OK** always performs post- processing, regardless of the default setting in the **CTMPARM** member.	Force OK
change the job status to **Ended OK** without performing the postprocessing actions of the job. [Only for jobs running under Control-M for z / OS version 6.2.00 and later.]	Force OK – no Post Processing

Table 54 Job intervention actions (Part 2 of 2)

Intervention	Menu option
terminate the job and its associated processes. **Note:** Killing a specific instance of a cyclic job does not affect subsequent runs of that job.	Kill
reactivate postprocessing for the selected job. [z/OS only]	React
rerun the job.	Rerun
restart the job using Control-M/Restart. [z/OS only] For instructions, see "To perform a restart (z/OS only)" on page 268.	Restart
view why the job has not yet been executed, and intervene as needed. Results are displayed in the Why dialog box. For instructions, see "To view why a job has not begun execution and to intervene if necessary" on page 269.	Why

Bypassing submission criteria

There are two extended options in the Bypass pop up menu, **Pre-Submission** and **Skip Job.** Selecting the **Pre-Submission** option selects all of the bypass options and runs the job when all other criteria are satisfied. Selecting the **Skip Job** option applies all of the **Pre-Submission** options (with the exception of **In Condition**) and runs the job as a dummy job. You can use this as a quick option to skip the job when it should be running.

To bypass selected submission criteria

1 Right-click the job node, select **Bypass > Select**.

2 In the displayed dialog box, check all required options as described in Table 55.

Table 55 Bypass options (Part 1 of 2)

The job should run...	Check option
... regardless of the Time From, Time Until and Next Time parameter values. **Note:** The Time Limit bypass does not include the Time zone parameter. That means that jobs that are waiting for a specific date will still wait for that date, even if the Time Limit bypass is checked.	Time Limit
... even if prerequisite IN conditions are not satisfied.	IN Conditions
... regardless of whether Quantitative resources specified in the job definition are available. **Note:** The Quantitative resource bypass also ignores the quantitative resource restrictions in the workload entities that the job belongs to.	Quantitative Resources
... regardless of whether control resources specified in the job definition are available	Control Resources

Table 55 Bypass options (Part 2 of 2)

The job should run...	Check option
... regardless of the restrictions set by the workload entities. **Note:** Workload Nodes Mapping rules enforced on jobs in the Active environment are not bypassed.	Workload and Node restrictions
... regardless of the job's SCHENV statement.	Scheduling Environment (z/OS only)
... regardless of whether other jobs using the same Pipe as that specified in the definition of this job are ready to run.	Pipes (z/OS only)
... even if Control-M is in Quiesce mode, either as a result of QUIESTIME or QUIESQRES commands.	Quiesce (z/OS only)
... without any of the jobs post-processing actions being performed, including On/Do actions, Out conditions, Shouts OK/NOTOK and Sysout handling. **Note:** When forcing a job that is set with Post Processing bypass, the job will end OK and will not perform the post processing actions.	Post Processing
... as a dummy job when the pre-submission criteria of the job are satisfied, and the job status should change to ENDED OK, and only the job post-processing actions in the job should be performed	Run as Dummy Job

3 After selecting the Bypass options, click **OK**. A confirmation dialog box is displayed.

NOTE

By default, all bypass options are unchecked. If you check any bypass option, that setting remains valid for the current run of the job. When the job is rerun, all bypass options are reset to the default, unchecked.

To perform a restart (z/OS only)

1 Right-click the job node, and in the pop-up menu choose **Restart**.

2 In the Job Restart dialog box (using uppercase letters only)

A Enter the range of steps to be restarted.

B Check any of the following tasks you want performed:

- Recapture Abend Codes
- Recapture Cond Codes
- Perform Step Adjustment

C If desired, specify the name of the member in the Control-R PARM library that contains processing defaults to be applied to the job.

D Click **OK**.

To view why a job has not begun execution and to intervene if necessary

1 Right-click the job node, and in the pop-up menu choose **Why**.

The Why dialog box opens displaying the reasons why the job did not run, for example, unavailable required resources or missing conditions.

2 If a prerequisite condition required by the job is missing, to add it do the following:

A Click on the line that identifies the missing condition

B If the Why dialog box shows a prerequisite condition with a date value of ******** or **$$$$**, you can change it to a specific date.

C Click **Add Condition**.

D If a confirmation is required, confirm the addition.

NOTE

If a NOT-Condition exists that prevents a job from running, click **Remove Condition**.

NOTE

You must be authorized to add or remove conditions.

Handling errors that occur when you intervene

When you perform job actions, the Action Report window automatically opens and displays the status of the requested actions. If errors occur, these appear in the window. You can also manually request display of the Action Report window.

To display job action messages

1 In the Control-M/Enterprise Manager window, choose **View => Output Windows => Action Report**.

Messages remain in the window until you clear them or until the maximum number of messages allowed has been reached. (The maximum is customizable. For details, see "Environment Display panel" on page 361.)

2 After reviewing the errors, click one of the following action choices:

- **Hide** — closes the Action Report window, but Control-M/EM continues to record all messages that are issued.
- **Clear** —erases all messages displayed in the Action Report window, leaving the window open.

Manually indicating satisfied conditions

Most commonly, prerequisite conditions are used to create job dependencies - that is, a predecessor job creates a prerequisite condition upon completion that is required for a successor job to be submitted.

But not all prerequisite conditions are added by jobs. When Control-M must know the status of something outside its control, you can add a manual condition to notify Control-M of the status.

For example, a backup job might require that a tape be physically loaded on a tape drive before the job can be submitted. To handle this, you can define in the job processing definition an In prerequisite condition (such as **Tape Loaded**) that is not added by another job, but rather, manually, by the operator, after physically loading the tape drive.

You can manually add and delete prerequisite conditions using the Prerequisite Conditions window.

You create, delete, and view prerequisite conditions in your production environment using the Prerequisite Conditions window.

NOTE

You can filter conditions on startup before they are loaded from the database. This is recommended when working with a large amount of conditions. For more information on filtering conditions on startup, see "Filtering prerequisite conditions on startup" on page 272.

To create or delete a prerequisite condition

1 In the Control-M/EM GUI, choose **Tools => Prerequisite Conditions**, which displays the Prerequisite Conditions window.

2 In the Prerequisite Conditions window, do the following as needed:

- To quickly filter, choose **View => Filter Row**, and enter the filter criteria.
- To filter the displayed data, click on the right top corner of a column header and select the appropriate filtering option.
- To create an advanced filter, right-click on any column header and choose **Filter Editor**. Use the Filter Builder to enter the appropriate filtering criteria and the relationships between them.

  The following information is useful for understanding the filtering criteria:

  - Name — the condition name
  - Order Date — specify the date for the condition. Valid values: specific date in mm/dd format or STAT- any date
  - Control-M

3 To create a prerequisite condition do the following:

A In the Prerequisite Conditions window, choose **Actions => Add**.

B In the displayed Prerequisite Condition dialog box, fill in the data that defines the prerequisite condition, and click **OK**.

4 To delete a prerequisite condition, select it and choose **Actions => Delete**.

NOTE

Addition and deletion of prerequisite conditions in one Control-M might affect prerequisite conditions in other Control-M installations (if the conditions are global). For details, see "Defining global conditions" on page 213.

Filtering prerequisite conditions on startup

You can filter prerequisite conditions on startup before they are loaded from the database. This is recommended when working with a large amount of conditions. In the status bar you can view the filter criteria.

To filter conditions on startup:

1 Choose **Options=> Show 'Refresh Filter' on startup**.

2 In the Refresh Filter dialog box, fill in the data that defines the condition and click **OK**.

To change the filter:

1 Choose **View=> Refresh Filter**.

2 In the Refresh Filter dialog box, fill in the data that defines the condition and click **OK**.

Manually rescheduling jobs in the active environment

Ideally, the process of ordering jobs or SMART Tables into the Active Jobs file should be automated through use of the New Day procedure or User Daily jobs. However you can manually reorder or force jobs SMART Tables appearing in the Active Jobs file as the need arises. To order or force jobs and SMART Tables, you must have the appropriate privileges.

To order or force jobs

1 In the Control-M / Enterprise Manager window, select **Tools => Order/Force**, or click .

The Order / Force Jobs dialog box is displayed.

NOTE

You can also order or force jobs using the cli command line utility (described in the *Control-M Utility Guide*). And you can order or force jobs from the definition environment using the Order / Force dialog box of Control-M / Desktop (for details, see "Manually scheduling jobs and tables" on page 198).

2 In the Order / Force Jobs dialog box, select the Control-M and optionally the table name. (For z / OS, select also a Library name.)

TIP

Several jobs or SMART Tables can be ordered / forced using the asterisk wildcard character in the table name or job name fields. For example:

- Specifying "UD1*" in the Table name will order / force 1 outermost table that matches this prefix.
- Specifying "UD1 / *" in the Table name will order / force 1 outermost table: "UD1"
- Specifying "UD1 / Job*" will order / force all jobs and / or Sub-tables whose name begins with "Job."

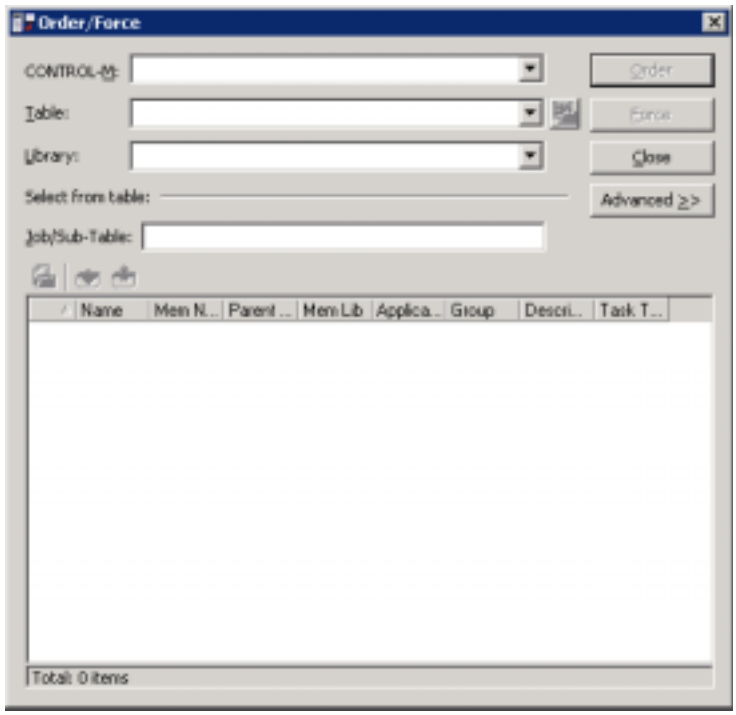
The dialog box displays the list of jobs, SMART Tables (Figure 16 on page 273) and Sub-tables. Double-clicking on a job displays the job editing form and double-clicking on a Sub-table displays the Sub-table's content in the list and the Sub-table's name with a / character in the **Table** field.

3 To order or force specific jobs in the table, select the jobs, or type a job name or mask. (To order or force all the jobs in the SMART Table, skip this step.)

NOTE

If the tables or jobs do not appear in the dialog box because they were created in Control-M after the last update between Control-M and the Control-M / EM database, type the names in the appropriate (job or table) text box.

Figure 16 Order/Force dialog box with advanced fields (in Control-M/EM)



4 To provide additional, optional order / force instructions, click **Advanced** and then select the options to be used, as follows:

- By default, SMART Tables and jobs are ordered or forced using the current ordering date (**ODAT**). To specify a different date, select the date in the **ODATE** area.
- To ensure that the jobs are not submitted before the Odate, select **Wait for Odate to run**. Otherwise, Control-M will submit the jobs as soon as their execution criteria are satisfied. (**Wait for Odate to run** applies to jobs or tables submitted under Control-M for z / OS version 6.2.00 or later, or under Control-M / Server version 6.3.00 or later.)
- To have the ordered or forced jobs or Sub-tables automatically placed in **Hold** status as soon as they start to run, click **Order/Force with Hold**.
- If you are ordering jobs and / or Sub-tables without ordering the table itself, click **Order/Force into Table**, and select the appropriate table pointer:
  - To place jobs and / or Sub-tables into a table in the active jobs file, click **New**.
  - To add jobs and / or Sub-tables to the table that was most recently ordered, click **Recent**. You can use this option only if you are forcing, not ordering, jobs and / or Sub-tables.
  - To force jobs and / or Sub-tables without adding them to a table, click **Stand Alone**. You can use this option only if you are forcing, not ordering, jobs and / or Sub-tables.
  - To select a SMART Table, click **Select**. Then click the displayed ellipsis (**...**), and in the displayed Select Active Group dialog box, select the SMART Table to which to add the jobs. You can use this option only if you are forcing, not ordering, jobs.

  If you chose **Recent** or **Selected**, to add jobs and / or Sub-tables to the SMART Table, even if jobs and / or Sub-tables with the same name already exist in the table, click **Duplicate**.

5 Click **Order** or **Force**.

Activating third-party applications

The Applications Activation feature enables you to insert job processing parameters from a Control-M job or SMART Table into a command line used to activate a third-party program. To use this feature, you must perform the steps described in this section:

1. Create an Activate Application definition.
2. Use the definition you created to activate the application.

After you have created an Activate Application definition, you can reuse it as needed to active the application.

To create an Activate Application definition

1 In the Control-M/EM window, choose **Tools => Activate Applications Editor**.

NOTE

You can only define an Activate Application definition from an Administrator account.

2 Perform one of the following actions in the Activate Applications Editor:

- To create a new Application Activation definition, click **New** ( ) and in the entry field that opens in the Applications area, specify a unique name for the Application Activation definition.
- To modify an existing Application Activation definition, select the definition in the Applications window.

3 Fill in (or modify) values for the definition, as follows:

A In the **Program** field, browse to and supply the full path and name of the application to run.

B In the **Initial Dir** field, browse to and supply the full path of the working directory. If not specified, the default is the Program directory.

C In the **Parameters** field, select parameters, flags or switches (including job processing parameters) to be passed on the command line to the program at runtime.

NOTE

- Inserted job processing parameters appear in red; literal values appear in black.
- When you insert a parameter after a path, a space is automatically inserted between the path and the variable. You should manually delete this space if it is not needed.
- The same parameter can be inserted multiple times.
- You can use the up and down arrows in the dialog box to change the positioning of listed applications, and the delete button to delete listed applications.

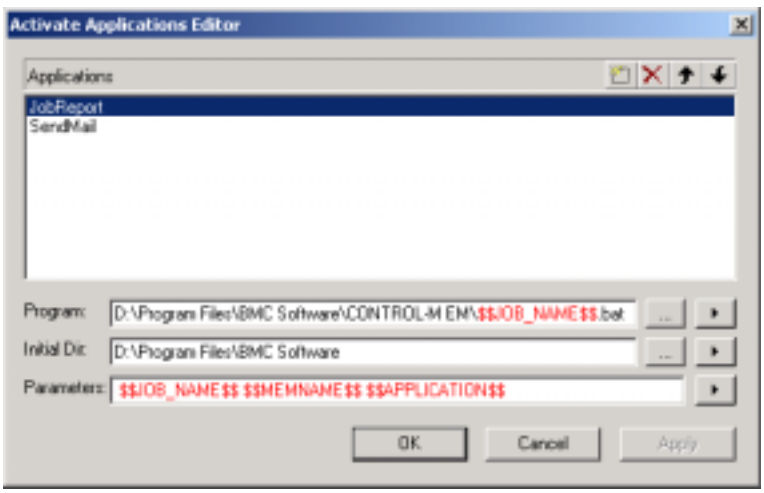
When you click **OK** or **Apply**, changes made to all definitions in the current session (not just the changes made to the currently selected definition) are accepted.

4 Click **OK**.

5 To rename an Application Activation definition, double-click it, edit the name, and press **Enter**.

Figure 17 displays an example of a filled in Activate Applications Editor dialog box.

Figure 17 Filled in Activate Applications Editor dialog box



To run an application using an Application Activation definition

1 In Control-M/EM, right-click a job or SMART Table node in the flow diagram or navigation tree, and in the pop-up menu, choose **Activate Application**.

2 In the displayed list, select the appropriate Application Activation definition.

The program runs, using the command line and table parameters specified in your definition.

NOTE

The Control-M on which the selected job was run does not need to be operational.

Chapter 23

Managing Workloads

This chapter presents the following topics:

Introduction to Workload Management. 279
Workload Manager 280
Defining or modifying a Workload 283
Definition tabs of the Workload window 284
Defining time periods for Workload Policies 289
Defining prioritization of Workload Policy node mapping enforcement. 292
Monitoring workloads. 293

Introduction to Workload Management

Control-M's Workload Management and Nodes Management features help you to better control, manage and balance the workload on Control-M resources and nodes. This is done in three primary areas:

- Limiting resources available to groups of jobs in the active environment
- Routing groups of jobs to execute on specific resources
- Defining a resource's availability in the dynamic environment according to specific times

With Control-M's Workload Management you can divide any or all of the jobs in the Control-M active environment into smaller groups of jobs. These groups of jobs are called Workloads. Jobs are grouped together according to shared general attributes in their job definitions. This is done by defining a job attribute filter for a Workload which associates any job with those attributes in the active environment with that Workload. Jobs can be associated with more than one Workload.

Managing Workloads is done by defining rules called a Workload Policy. A Workload Policy enforces its rules on all jobs associated with the Workload. In this way you can quickly affect large numbers of jobs processing definitions without manually changing the jobs' definitions individually.

Workload Policy rules can limit the resources that the jobs associated with a Workload can consume and specific times can be defined for when these rules enforced. This prevents a Workload from taking control of all available resources and preventing other jobs from running.

A Workload Policy can route certain jobs associated with a Workload to a specific node. This allows you to change the execution node defined for certain jobs in the active environment and re-route groups of jobs without actually affecting the jobs' definitions.

With Nodes Management, the load on any node machine or node group can be controlled. You can limit the usage of a node and the specific times when those limitations will be applied. A node's participation in a node group can also be defined for specific times. This helps you control the nodes available to the jobs in the active environment. Nodes Management is performed using the Control-M Configuration Manager's Node Manager option. For more information, see the Control-M *Administrator Guide*.

The following is a list of actions that can performed using the Control-M/EM GUI and Desktop:

- Define a new Workload. See "Filter" on page 284.
- Limiting the Workload's quantitative resource consumption. See "Resources" on page 286.
- Limiting the number of jobs associated with the Workload which can be concurrently running on a specific Control-M. See "Running jobs" on page 287.
- Routing a group of jobs associated with the Workload to a new node. See "Nodes Mapping" on page 287.
- Defining specific time periods when a Workload Policy's resource limitations and concurrently running jobs limitations are applied to the Workload's jobs. See "Defining time periods for Workload Policies" on page 289.
- Monitoring the status of jobs within a Workload. See "Monitoring workloads" on page 293.

Workload Manager

The Workload Manager window displays a list of Workloads, their internal order and their details. Workloads can also be defined, modified, or copied using the Workload Manager (See "Defining or modifying a Workload" on page 283).

In the Control-M/Enterprise Manager GUI or Control-M/Desktop, click **Tools** => **Workload Management=> Workload Manager** to display the Workload Manager window.

See the following table for the column names and definitions.

Table 56 Workload Manager window

Column Name	Description
State	This indicates the state of the workload. Select either: ■ Active ■ Inactive
Order No.	This indicates the order in which Workload Policy nodes mapping rules are enforced on job's execution definitions. Once a job's execution definitions have been affected by a Workload Policy they cannot be changed by subsequent Workloads in the ordered list. See "Defining prioritization of Workload Policy node mapping enforcement" on page 292.
Name	This is the workload's name.
Last Update	This indicates the last update of a workload or its creation date if it is a new workload. The displayed date is based on the local settings of the machine.
Description	This is a free text description of the workload entered by the user.

Use the Workload Manager toolbar buttons to perform the following actions:

Table 57 Workload Manager toolbar

Toolbar button	Action
Copy	Copies an existing workload. A new name must be defined for the new workload.
Print	Prints the workload list. This action is available to all users, including those with only browse authorization.
Export	Exports the data in the list to an Excel file. This action is available to all users, including those with only browse authorization.
New	Creates a new workload. Clicking this button opens the workload definition properties window. Full authorization is required to perform this action.

Table 57 Workload Manager toolbar

Toolbar button	Action
Properties	Opens the workload properties window for update or browse. This action is enabled when one, and only one, workload in the list is selected. This action is available to all users, including those with only browse authorization.
Delete	Deletes existing workloads. This action is enabled when at least one workload in the list is selected. Multiple Workloads can be selected and deleted at the same time. Full authorization is required to perform this action.
Move Up Workload	Defines a higher priority for the selected workload over other workloads on the list. Full authorization is required to perform this action. **Note:** Workload list must be sorted by **Order No.** for this option to be available.
Move Down Workload	Defines a lower priority for the selected workload below other workloads on the list. Full authorization is required to perform this action. **Note:** Workload list must be sorted by **Order No.** for this option to be available.
Open into Viewpoint	In the Control-M/Enterprise Manager GUI, opens a viewpoint with the default hierarchy (Control-M => **Application => Group => Jobs**) and the filter according to the workload attributes.

Table 57 Workload Manager toolbar

Toolbar button	Action
Synchronization status	Opens the Synchronization Status window. This window displays a list of all Control-Ms, version 7.0.00 and higher, and their synchronization status. If a Control-M is not synchronized, then the **Message** column in this window will give a description of the problem. The Control-M/Enterprise Manager propagates workload information to the Control-Ms. Each Control-M has one of the following synchronization statuses: ■ Synchronized - the relevant Control-M is synchronized with the Control-M/Enterprise Manager. All relevant workload settings were sent to the Control-M and are confirmed ■ In Process - the Control-M/Enterprise Manager sent the relevant workload settings to the relevant Control-M and is awaiting confirmation. There has not been a time-out for reception of this confirmation ■ Not Synchronized - the Control-M/Enterprise Manager sent the relevant workload settings to the relevant Control-M, but did not receive a confirmation from the Control-M before reaching a time-out ■ Not connected - workload settings were planned to be sent to the Control-M, but it is not connected to the Control-M/Enterprise Manager Gateway. At the bottom of the **Workload Manager** window a visual notification for the aggregated workload synchronization status will appear. The displayed status is that of the Control-M with the most severe status. After clicking **Apply** or **OK** the **Action Report** window will be displayed with a list of all Control-M/Enterprise Managers, version 7.0.00 and higher, and their statuses.
Open Workload Monitor	Opens the Workload Monitor window.
Refresh	Refreshes the information in the list of Workloads.

Defining or modifying a Workload

To create or modify a workload:

1 In the Workload Manager window:

- Click **Actions** => **New Workload** to define a new Workload.
- Select a workload and right-click, then select **Workload Properties** to modify an existing Workload.

The Workload window is displayed.

2 Define the Workload's name, state and description. Once a Workload's name is defined it cannot be modified.

3 Define or modify the Workload's rules in one or all of the following tabs:

- Filter - See "Filter" on page 284
- Resources - See "Resources" on page 286
- Running Jobs - See "Running jobs" on page 287
- Nodes Mapping - See "Nodes Mapping" on page 287

Defining limitations and nodes mapping is optional for a Workload.

4 To save all of the definitions and / or modifications made to the Workload and close the Workload Window click **OK** at the bottom of the Workload Manager window. The Control-M / Enterprise Manager GUI Server saves the data in the database.

NOTE

Control-M Server can reject the update if the data was being updated from an additional interface in parallel. The user can force the update or cancel.

Definition tabs of the Workload window

The following section describes the tabs in the Workload window and how they are used to define a Workload Policy.

Filter

Jobs are included in a workload if they contain the attributes defined in the workload's filter. Enter a value or select a value from the drop-down menu for the following filter attributes:

- Job Name / Mem Name (Mem Name is for z / OS jobs only)
- Control-M
- Application
- Group
- Table
- Job Type
- Node ID / Group

Each attribute filter is optional, but at least one attribute must be defined to establish a pattern for filtering the workload's jobs. You can also use prefixes and suffixes as pattern-matching strings. Jobs that match the pattern string will become part of the workload. For example, if there are 3 jobs entitled Job1, Job2, and Job3, then setting the filter to Job* will include all three jobs.

Table 58 describes the symbols that can be used in a workload filter.

Table 58 Symbols used to compose pattern-matching strings for workloads

Symbol	Name	Usage
*	Asterisk wildcard	Denotes any number of characters (including no characters). This can be inserted in place of a string or in the middle of the pattern-matching string in the place of any number of characters. **Note:** If one or more of the filter criteria fields is not needed, it is more efficient to leave the field blank than to use the "*" character. However, at least 1 filter field must contain a value.
?	Question mark wildcard	Denotes any single character. This can be inserted in place of any number of characters.
,	Comma	Used to separate pattern-matching strings, enabling the user to specify more than one string (the comma represents a Boolean OR). **Example** (host01, host02, host03) **Note:** "," is evaluated literally in collection and filter definition fields.
character	Character	Any character, other than one of the above, denotes the specific character. **Note:** In case-sensitive fields, Control-M / Desktop differentiates between uppercase and lowercase characters (for example, "a" and "A" are regarded as two different characters).
specialchar	Escape character	Denotes the literal value of the special character. The special characters are the symbols described in this table. **Examples** ■ To specify \, type \\. ■ If you specify **\.** then "**.**" has the meaning of period and not the same meaning as **?.** ■ Use "\" to escape **!** only where **!** is the first character.

To save the definitions or modifications proceed to step 4 on page 284. To continue defining or modifying a workload select a tab and continue.

Resources

In the **Resources** tab the user can define the quantitative resource units available to the jobs associated with the Workload.

EXAMPLE

For example, if a quantitative resource is defined as having 10 units, the Workload Policy can limit the resources units available to the jobs associated with the Workload to 5.

In this example the Workload's jobs can continue to consume up to 5 resource units and then the remaining jobs will be in Wait Node status until units are available.

This will prevent the Workload's jobs from taking control of all available resource units. The 5 additional resource units, up to 10, are available to other jobs.

NOTE

If a specific job associated with a Workload requires a number of quantitative resource units greater than that limited by the Workload Policy rules, the job will not be submitted.

To limit the quantitative resources available to the jobs associated with a Workload:

1 Click **Add** for a new quantitative resource definition or double-click a definition from the list to modify an existing one. The **Quantitative Resource - Period Definition** window is displayed.

2 Enter the name of the Control-M or select one from the drop-down menu in the **Control-M** field.

3 Enter a resource name or select one from the drop-down menu in the **Name** field.

The listed resources in the drop-down menu are the ones defined for the selected Control-M in step B.

4 Enter a number in the **Quantity** field to limit the number of resource instances available to the jobs in the workload.

5 Define the date and time that the Workload Policy limitations will be enforced. See "Defining time periods for Workload Policies" on page 289.

6 Click **OK**.

7 To save the definitions or modifications proceed to step 4 on page 284. To continue defining or modifying a workload select a tab and continue.

Running jobs

In the Running Jobs tab you can limit the number of jobs associated with the Workload that are running concurrently on a specific Control-M. Time and date periods can be defined for when these limitations are applied.

To define limitations for running jobs:

1 Click the Add button for a new running jobs definition or double-click a definition from the list to modify an existing one.

NOTE

You can copy existing definitions to create a new running jobs by selecting a definition from the list and clicking **Copy.**

The **Number of Running Jobs - Period Definition** window is displayed.

2 Enter the name of the Control-M or select one from the drop-down menu in the **Control-M** field.

The user can also select <On Each> to limit the number of jobs on all Control-Ms defined in the filter.

3 Define the maximum number of jobs that can run simultaneously in the **Number of running jobs** field.

4 Define the date and time that the Workload Policy limitations will be enforced. See "Defining time periods for Workload Policies" on page 289.

5 Click **OK**.

6 To save the definitions or modifications proceed to step 4 on page 284. To continue defining or modifying a workload select a tab and continue.

Nodes Mapping

A job may be defined with a specific node ID / Group on which the job will be executed. This is defined in the Execution tab of the job editing form.

In the Nodes Mapping tab of the Workload window you can map a specific node ID / Group that is defined for jobs in the Workload to another node ID / Group.

When a job is associated with a Workload and the Nodes Mapping rules affect the jobs execution node ID / Group, the job's execution node ID / Group definition is actually changed. The change is applied immediately to the job's execution definition unless the job is currently running, in which case the change is applied once the job has finished.

An icon indicating that the execution node has been changed is displayed next to the node ID / Group field in the Execution tab of the job's job editing form.

EXAMPLE

The job **DailyReport_1** is defined to be printed every afternoon on a machine designated as node ID **ReportServer_A.**

ReportServer_A needs to be switched off for maintenance.

Another server, **ReportServer_B**, is available to perform the same functionality.

DailyReport_1 is associated with a Workload. The Nodes Mapping rules for the Workload route all associated jobs which are defined to execute on node ID **ReportServer_A** to be executed on node ID **ReportServer_B**.

Therefore, **DailyReport_1,** which has node **ReportServer_A** defined as the execution node, will be routed to execute on node **ReportServer_B**.

If the Workload is deleted after it has had an affect on a job's node mapping, then the job's execution node ID / Group will return to its originally defined value. The original value is saved and can be viewed in the job's log.

If the job's execution node definition is manually changed after it has been affected by the Workload Policy, the Nodes Mapping rules will no longer affect the job's execution node ID / Group.

Once a job's execution node ID / Group has been affected by a Workload's Nodes Mapping rules it cannot be affected subsequently by another Workload. This means that if a job belongs to more than one Workload, then the nodes mapping of the first Workload to affect the job will be enforced.

You can define the order in which Workload Entities' rules are given prioritization in the Workload Manager window. See "Defining prioritization of Workload Policy node mapping enforcement" on page 292.

To map node groups or node IDs:

1 Click the **Add** button for a new Node Groups / Node IDs mapping definition.

2 Enter the name of the Control-M or select one from the drop-down menu in the **Control-M** column.

3 Enter the name of the node group or ID, or select one from the drop-down menu of the **Node Groups/Node IDs** field.

4 Enter the name of the node group or ID, or select one from the drop-down menu of the **Map To** field.

The node group or ID defined in the **Node Groups/Node IDs** column will be mapped to node group or ID defined in the **Map To** column.

NOTE

The **Node Groups/Node IDs** field lists all node groups and IDs defined by the selected Control-M in the drop-down menu. If a Control-M has not been selected or nodes groups have not been defined for this Control-M, the list will be blank.

5 Click **OK**.

6 To save the definitions or modifications proceed to step 4 on page 284. To continue defining or modifying a workload select a tab and continue.

Defining time periods for Workload Policies

You can define date and time periods when the limitations defined for quantitative resources and concurrently running jobs will be applied.

You define these periods by using a combination of date type and time type. A type can be a specific, periodic or range of dates and times.

All dates are according to the Control-M's logical date.

To define a time and date period

1 In the **Resources** or **Running Jobs** tab of the **Workload** window, click **New**. The **Quantitative Resource/Number of Running Jobs - Period Definition** window is displayed.

2 Define a Control-M in the **Control-M** field or select one from the drop-down menu.

3 For the **Resources** tab:

A Enter or select the name of the quantitative resource in the **Name** field.

B Define the quantity of resource instances available to the workload in the **Quantity** field.

For the **Running Jobs** tab:

A Define the maximum number of running jobs in the **Number of running jobs** field.

4 See the following table for descriptions and steps for defining date type and time type combinations for the period definition. A preview of the period definition is displayed in the **Preview** field at the bottom of the window. Time type is defined in increments of 15 minutes.

Table 59 Date and Time Type

Date Type Option	Defining Date and Time
All Days	Selecting All Days in the **Date Type** field defines all days in the calendar. In the **Time Type** select either: ■ All Hours - 24 hours per selected day ■ Between - **From** and **To** fields appear to define the range of hours. The period is defined as all calendar days during the defined hours.
Every (periodic day of the week)	Selecting this option displays a list of the days of the week with a check box next to each and the **Time** section at the bottom of the screen. 1. Select the check box next to the desired day in the **Date** section. 2. In the **Time Type** select either: ■ All Hours - 24 hours per selected day ■ Between - **From** and **To** fields appear to define the range of hours. The period is defined as each selected day during the defined hours.

Table 59 Date and Time Type

Date Type Option	Defining Date and Time
Between (specific days in the calendar)	Selecting this option displays a **From** and **To** fields for date and time**.** 1. Edit the date in the **From** and **To fields** or select a date from the calendar by clicking the drop down arrow next to the fields. 2. In the **Time Type** select either: ■ All Hours - 24 hours per selected day ■ Between - **From** and **To** fields appear to define the range of hours. The period is defined from a start date to an ending date, during the defined hours for each of the days in the range.
Between (specific date and time)	Selecting this option displays a **From** and **To** fields for date and time**.** 1. In the **From** and **To** field edit the date or select a day from the calendar by clicking the button to the right of the field. 2. Edit the hours and AM/PM in the **From** and **To** fields. The period is defined from the start date and time until the end date and time.

Table 59 Date and Time Type

Date Type Option	Defining Date and Time
Every Week Between (day of the week and times)	Selecting this option displays a **From** and **To** fields for day of the week and time of day. 1. Select a day of the week from the drop down menu. 2. Edit or scroll the hour and AM/PM. The period is defined as a range starting from a day of the week and time to an end day of the week and time.
On (specific days in calendar)	Selecting this option displays a date list and time type field. 1. Click the drop down arrow in the **Days** field. 2. Select a day from the calendar. The selected day is displayed in the **Days** field. 3. Click **Add to list**. The date is added to the list on the right of the window. To remove a date select the date and click the delete button. 4. In the **Time Type** select either: ■ All Hours - 24 hours per selected day ■ Between - **From** and **To** fields appear to define the range of hours. The period is defined as all selected dates in the list between the hours defined.

5 Click **OK**. The defined period will be displayed in the **Period** column of the **Resources** or **Running Jobs** tabs.

Defining prioritization of Workload Policy node mapping enforcement

You can define an internal order to Workload Entities. Workload Policy Nodes Mapping rules are evaluated in this order and may therefore directly affect the execution of jobs. Resource and running jobs limitations are not affected by this order.

If a job is associated with more than one Workload, and those Workload Entities have conflicting Nodes Mapping rules, the Nodes Mapping rule of the first Workload to affect the job is the one enforced. Once this rule is enforced on a job, subsequent mapping rules of other Workload Entities will not affect the job's execution definition.

To define the priority order the workload list:

1 In the Workload Manager window, sort the list of workloads by the **Order No.** column.

2 Select a Workload in the list by clicking on its row. The row is highlighted.

NOTE

Only active workloads can be given a priority order in the list. Inactive workloads do not have a priority status.

3 Click the up or down arrows on the Workload Manager toolbar to move the workload to the desired order on the list.

4 Click **OK** or **Apply**.

5 Confirm by clicking **OK** when prompted.

Monitoring workloads

The Workload Monitor enables the user to see the current status of jobs from the workload perspective.

To display the Workload Monitor from the Control-M/Enterprise Manager GUI or Control-M/Desktop click **Tools**=>**Workload Management**=>**Workload Monitor**. The Workload Monitor window appears with a list of workloads in the active environment.

The following table lists the columns in the Workload Monitor window with its description.

Table 60 Workload Monitor window columns

Column Name	Description
Name	Indicates the workload's name.
Wait Nodes	Indicates the number of jobs waiting for nodes resources due to one of the following reasons: ■ agent or execution host is unavailable ■ node currently has its max number of jobs running ■ node has reached its max CPU usage restrictions

Table 60 Workload Monitor window columns

Column Name	Description
Wait Workloads	Indicates the number of jobs waiting due to restrictions on the maximum number of jobs running concurrently in the workload policy.
Running Jobs	Indicates the number of jobs that are currently running simultaneously.

At the bottom of the Workload Monitor window a table row is displayed. The columns in this row show the number of jobs according to the column definition for all jobs in the Active Jobs File. The column totals do not count jobs twice. That means that if a job appears in more than one workload it will only be counted once in the total column.

In addition to the above default columns displayed in the Workload Monitor window, customized columns can be added to the primary list of workloads and table row at the bottom of the window.

To add or remove columns from the Workload Monitor display:

1 Right-click on any column name in the Workload Monitor window. To add summary columns, right-click on a column name at the bottom of the screen.

2 Select **Column Chooser**. The Customization window appears with a list of column names.

3 Add or remove a column by dragging and dropping the column in the order of your choice in the Workload Monitor window or to the Customization window.

The following table describes the additional Workload Monitor columns.

Table 61 Additional Workload Monitor columns

Column name	Description
Ended OK	Indicates the number of jobs that ended OK.
Ended Not OK	Indicates the number of jobs that ended Not OK.
Total Waiting	Indicates the total number of waiting jobs, including all jobs in: ■ Wait Resources ■ Wait Nodes ■ Wait Workload
Wait User	Indicates the number of jobs in Wait User status.
Wait Condition	Indicates the number of jobs in Wait Condition status.
Description	This is the description of the workload as defined in the Workload Manager window.
Total	This is the total number of jobs in the workload(s).

To view the properties of a workload:

1 Select the Workload by clicking on the workload's row.

2 Select **Actions** => **Workload Properties.** The Workload window appears in Read Only format.

To view the jobs in a specific workload:

1 Select the workload in the Workload Monitor window in The Control-M/EM GUI. The list of jobs cannot be viewed from the Control-M Desktop.

2 Click **File**=>**Open into viewpoint**. The workload is displayed in the Tree view and flow diagram.

Chapter 24

Control-M Self Service management

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Control-M Self Service management overview

Control-M Self Service is a web-based application that enables you to view your services, which are containers of jobs, and analyze those services and jobs that are problematic. After you have determined what the problems are, you can resolve them by performing various service and job actions.

Before you can view services in Control-M Self Service, you need to create services in the Service Definition Manager, which enables you to model the production environment for your end users.

The Service Definition Manager enables you to create, edit, and delete the following entities:

- **Service definitions**: A service is a group of one or more jobs that are aggregated based on job filtering criteria, ODAT, SMART table, or a job, as described in "Service definitions" on page 298.
- **Service Rules**: A service rule is a service generation definition that enables you to manually or automatically generate services, as described in "Service rules" on page 303.

Service definitions

A service is a group of one or more jobs that are aggregated based on job filtering criteria, ODAT, SMART table, or a job.

You can create a service definition, which enables the service to appear in Control-M Self Service when a job that belongs to the service appears in the AJF.

The following procedures describe how to create, edit, copy, and delete service definitions:

- "Creating a service definition" on page 299
- "Editing a service definition" on page 301
- "Copying a service definition" on page 302
- "Deleting a service definition" on page 303

Creating a service definition

This procedure describes how to create a service definition, which enables the service to appear in Control-M Self Service when a job that belongs to the service appears in the AJF.

Before You Begin

Successful completion of "Starting Control-M / Desktop" on page 26

To create a service definition:

1 From the **Tools** menu, select **Service Definition Manager**.

The **Service Definition Manager** window appears.

2 From the **Add New Service Rule** dropdown list, select **Add New Service Definition**.

The **Service Definition** dialog box appears.

3 In the **Name** and **Description** fields, type the name and description of the service.

4 Select one of the following options, as described in Table 62.

Table 62 Service options

Option	Description
Service based on filter	Determines which jobs are part of a service based on the selected filters. For a detailed description of these filters, see the *Control-M Parameters Guide*.
Service per ODAT based on filter	Creates a separate service instance for all jobs that matches the selected filters and have different ODAT values.
Service per SMART Table	Creates a separate service instance for every instance of a SMART table, defined in the **Filter** tab, that enters the AJF. To group jobs to a SMART table, see "Creating and editing SMART Tables" on page 127. To ensure that each orderable service is a unique entity, and not dependent on conditions from another service, see "Modifying dependencies for jobs within a SMART table" on page 139.

Table 62 Service options

Option	Description
Service per job	Creates a separate service instance for every instance of a job, defined in the **Filter** tab, that enters the AJF.
Orderable	Enables Control-M Self Service users to order this service. This feature is enabled only if you select **Service per SMART Table** or **Service per job**. For these service types, a specific SMART table or job is ordered when the service is ordered. If you select this option, the **Orderable Parameters** tab appears. If you want to define parameters for this service, go to step 5, otherwise, continue with step 7.

5 Click the **Orderable Parameters** tab and then click .

The **New Service Parameter** dialog box appears.

6 Type or select the required values, as described in Table 63, and then click **OK**.

Orderable parameters can be used to send AutoEdit parameters to the SMART table or job of the service when a service is ordered by a Control-M Self Service user.

Table 63 New Service Parameter dialog box

Field	Description
Name	Defines the AutoEdit name of the service parameter
Display Name	Defines the display name of the AutoEdit that appears for the Control-M Self Service end user when ordering a service
Type	Determines whether the AutoEdit is a string, integer, Yes / No or is a enumerated value
Required	Determines whether a Control-M Self Service user must enter a value for this service parameter
Validation	Determines the possible values based on the selected parameter type: **Note**: For enumerated fields, possible values must be separated by a comma. For Yes / No fields, the value determines the AutoEdit value that is used when the user selected **Yes** or **No** when ordering the service.
Default Value	Shows the default value of the AutoEdit, as defined in the job or SMART table definition

7 Click the **Filter** tab.

8 Select the jobs that you want to attach to this service by doing one of the following:

- If you selected **Service based on filter** or **Service per ODAT based on filter**, type or select the required values, as described in the *Control-M Parameters Guide*, or click **Advanced Filtering**, and go to step 9.
- If you selected **Service per SMART Table** or **Service per job**, type or select the required values, as described in the *Control-M Parameters Guide*, and go to step 10.

9 To add a filter, which includes or excludes jobs, do the following in the **Including Filters** or **Excluding Filters** area:

A In the **Field** column, select a job attribute.

B In the **Operator** column, select the operator that you want to use.

C In the **Value** column, type a value for the job attribute.

D Repeat step A through step C as necessary.

E If you want to add another group of fields which, when met, can include more fields, even if the other group of fields do not meet the conditions, click .

NOTE

Jobs that match the excluding filter are not included in the service, even if they match the including filter. The service only includes jobs that match the including filter, but don't match the excluding filter.

10 Click **OK**.

The service definition is created and added to the **Service Definition Manager**.

Editing a service definition

This procedure describes how to edit a service definition.

Before You Begin

Successful completion of "Starting Control-M / Desktop" on page 26

To edit a service definition:

1 From the **Tools** menu, select **Service Definition Manager**.

The **Service Definition Manager** window appears.

2 Select the service definition that you want to edit and click .

The **Service Definition** dialog box appears.

3 Edit the required fields in the **General** tab, **Filter** tab and/or the **Orderable Parameters** tab, as described in "Creating a service definition" on page 299.

4 Click **OK**.

Copying a service definition

This procedure describes how to copy a service definition in the Service Definition Manager so you can use it as a template.

Before You Begin

Successful completion of "Starting Control-M/Desktop" on page 26

To copy a service definition:

1 From the **Tools** menu, select **Service Definition Manager**.

The **Service Definition Manager** window appears.

2 Select the service definition that you want to copy and click .

The **Service Definition** dialog box appears.

3 In the **Name** field, type a new name for this service.

You can also update other fields, as described in "Creating a service definition" on page 299.

4 Click **OK**.

Deleting a service definition

This procedure describes how to delete a service definition from the Service Definition Manager.

Before You Begin

Successful completion of "Starting Control-M / Desktop" on page 26

To delete a service definition:

1 From the **Tools** menu, select **Service Definition Manager**.

The **Service Definition Manager** window appears.

2 Select the service definition that you want to delete.

3 Click .

A confirmation message appears.

4 Click **Yes**.

The service definition is deleted.

Service rules

A service rule is a service definition that enables you to manually or automatically generate services based on filtering and grouping criteria.

There are two types of service rules:

- **Active rule**: Inspects the jobs in the AJF automatically and generates service definitions that will appear in Control-M Self Service. This reduces the maintenance of creating multiple service definitions individually.

  For example, you can define an active rule that creates a service for all jobs that belong to APP_Sales and GRP_Eur. Every time a new job enters the AJF and matches the rule, a new service instance automatically appears in Control-M Self Service. This relieves you from creating a new service definition every time new application or groups that match the rule appear in the AJF, such as APP_Sales1, APP_Sales2, or GRP_Eur_North, GRP_Eur_South.

- **Manual rule**: Enables you to inspect job definitions manually before you generate the service definitions. This allows you to determine which service definitions to generate for display in Control-M Self Service.

The following procedures describes how to create, edit, copy, and delete service rules and generate service definitions from the **Service Rule** wizard:

- "Creating a service rule" on page 304
- "Editing a service rule" on page 307
- "Copying a service rule" on page 308
- "Deleting a service rule" on page 308
- "Generating services from a rule" on page 309

Creating a service rule

This procedure describes how to create a service rule, which enables you to manually or automatically generate services for jobs.

Before You Begin

Successful completion of "Starting Control-M/Desktop" on page 26

To create a service rule:

1 From the **Tools** menu, select **Service Definition Manager**.

The **Service Definition Manager** window appears.

2 Click **Add New Service Rule**.

The **Service Rule** wizard appears.

3 In the **Name** and **Description** fields, type the name and description of the service rule.

4 Do one of the following:

- If you want Control-M/EM server to automatically generate services by inspecting the jobs in the AJF, leave the **Active** checkbox selected, and click **Next**.
- If you want to manually create services for job definitions, unselect the **Active** checkbox, and click **Next**.

The **Selection** window appears.

5 Apply filters on jobs that are relevant for the service rule, and then click **Next**.

For a detailed description of these fields, see the *Control-M Parameters Guide*. If you want more job filters, select **More**.

The **Grouping** window appears.

6 Select one of the following:

- **Group jobs to services according to**: Determines which jobs are part of a service based on the selected fields. For a detailed description of these fields, see the *Control-M Parameters Guide.*

  For each grouping field, you can determine whether the grouping is according to the entire value of the field, or according to the first or last letters of the field's value.

  EXAMPLE

  If you group by the first 3 letters of the Application field, jobs with Application BACKUP01 and BACKUP02 will be in the same service, but jobs with Application BATCH_JOBS will be in a different service.

- **Generate service per SMART Table:** Generates a separate service instance for every SMART table that enters the AJF that matches your filtering criteria.

- **Generate service per job:** Generates a separate service instance for every job that enters the AJF that matches your filtering criteria.

7 Click **Next**.

The **Properties** window appears.

8 Define a format for service name and description of the generated service definitions.

The maximum character length for the service name is 200 and 400 for the description.

You can use field placeholders which are replaced by actual job attributes in the generated services.

EXAMPLE

The format name **Service for {Application} in {Group}** might create a service named **Service for app1 in group1** that contains jobs with Application=app1 and Group=group1

NOTE

If you group according to the first or last letters of the field's value, the placeholder is replaced by the first or last letter.

In the first example of this procedure, **Service for {Application}** is replaced with **Service for BAC** and **Service for BAT** for the two generated services.

9 Do one or more of the following:

- To enable Control-M Self Service users to order the generated services, select the **Orderable** checkbox.

  This option is only enabled if you selected **Generate service per SMART Table** or **Generate service per job** in the **Grouping** window and the **Active** checkbox is not selected in the **General** window.

- To automatically add orderable parameters to the generated orderable services, select the **Add automatically orderable parameters to each service**.

  The generated parameters are taken from the AutoEdits of a service's SMART Table or job definition. This option is only enabled if the **Orderable** checkbox is selected.

- To generate a separate service instance for each ODAT, select **Service Instance Per ODAT**.

  This option is only enabled if you selected **Group jobs to services according to** in the **Grouping** window.

10 Do one of the following:

- If the **Active** checkbox in the **General** window is not selected and you want to manually create service definitions from the service rule, see "Generating services from a rule" on page 309.

- If the **Active** checkbox in the **General** window is selected and you want to automatically create service definitions from the service rule, click **Finish**.

  The service definitions are automatically created. When a job that belongs to a service rule enters the AJF, the service appears in Control-M Self Service.

NOTE

Services that are automatically generated for active rules are maintained by the Control-M/EM server and do not appear in the **Service Definition Manager** window. They are only visible in Control-M Self Service.

- To review the possible services, click **Next**.

  The **Review Services** window appears.

11 View the jobs in each service by clicking **View Jobs**, and do one of the following:

- To view jobs of the selected service that are in the active environment, select **Active**.
- To view jobs of the selected services that are not in the active environment, select **Definition**.

12 Click **Finish**.

The service rule is saved and appears in the **Service Definition Manager.**

Editing a service rule

This procedure describes how to edit a service rule.

Before You Begin

Successful completion of "Starting Control-M/Desktop" on page 26

To edit a service rule:

1 From the **Tools** menu, select **Service Definition Manager**.

The **Service Definition Manager** window appears.

2 Select the service rule that you want to edit and click .

The **Service Rule** wizard appears.

3 Edit the required fields in the **General**, **Selection**, **Grouping,** and **Properties** windows, as described in "Creating a service rule" on page 304.

4 From the **Properties** window, click **Finish**.

Copying a service rule

This procedure describes how to copy a service rule in the Service Definition Manager so you can use it as a template.

Before You Begin

Successful completion of "Starting Control-M/Desktop" on page 26

To copy a service rule:

1 From the **Tools** menu, select **Service Definition Manager**.

The **Service Definition Manager** window appears.

2 Select the service rule that you want to copy and click .

The **Service Rule** wizard appears.

3 In the **Name** field, type a new name for this service rule.

4 Click **Next** and update the required fields in the **Selection**, **Grouping,** and **Properties** windows, as described in "Creating a service rule" on page 304.

5 From the **Properties** window, click **Finish**.

Deleting a service rule

This procedure describes how to delete a service rule from the Service Definition Manager.

Before You Begin

Successful completion of "Starting Control-M/Desktop" on page 26

To delete a service rule:

1 From the **Tools** menu, select **Service Definition Manager**.

The **Service Definition Manager** window appears.

2 Select the service rule that you want to delete.

3 Click .

A confirmation message appears.

4 Click **Yes**.

The service rule is deleted.

Generating services from a rule

This procedure describes how to manually generate services from a rule that was previously created.

Before You Begin

Successful completion of "Starting Control-M / Desktop" on page 26

To generate service from a rule:

1 From the **Tools** menu, select **Service Definition Manager**.

The **Service Definition Manager** window appears.

2 Select a rule that contains the services you want to generate and from the **Actions** menu, click **Generate Services From Rule**.

The **Generate Services - Service Rule <*serviceRule*>** window appears.

3 Select the service definitions that you want to generate and click **Generate.**

The service definitions are created and appear in the **Service Definition Manager.**

Chapter 25

Service monitoring

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Monitoring services 312

Service monitoring overview

The Service Monitor in the Control-M/EM GUI enables you to view the following service types:

- **Services**: Enables you to view service logs, open services in a viewpoint, and create service notes.
- **BMC Batch Impact Manager services**: Enables you to open Batch Impact Manager job editing forms, open services in a viewpoint, view problematic jobs, view service logs, create service notes, update service deadlines, find Batch Impact Manager jobs, and create service assumptions.

For more information about BMC Batch Impact Manager, see the *Control-M Business Service Management Solution User Guide*.

To monitor a service, see "Monitoring services" on page 312.

Monitoring services

This procedure describes how to monitor services and Batch Impact Manager services in the Service Monitor.

NOTE

The word Disconnected in the title bar indicate when the BMC Batch Impact Manager Server or the Self Service Server is down. When one of the servers are down, you cannot use this window to track services.

To monitor services from Control-M/EM:

1 Select **Tools > Service Monitor** from Control-M/EM.

The Service Monitor window is displayed, showing services, their status, and other relevant information such as their estimated completion times, and the number of jobs in the service that have already completed.

2 You can perform the following functions by right-clicking on the selected service:

NOTE

The default refresh interval for refreshing the Service Monitor window is one minute. This default can be modified by changing the Automatic Refresh parameter in the Service Monitor Window panel under **Tools => Options**.

- Open all the jobs of the service in a new flow diagram by selecting **Service => Open Business Service ViewPoint**.

- View all problematic jobs in a service that have failed or ended late by selecting **Service => View Problematic jobs** (*BMC Batch Impact Manger only*).

- View the log of the service by selecting **Service** => **Service Log**. The log provides information about changes in the service's status and the reasons for the respective changes. You can select an entry and view the details for the entry, using the Service Details window.

- Add free text information about the service by selecting **Service => Service Notes.** For example, you can mark the service that it is handled by operator A**.**

- Jump to the BMC Batch Impact Manager job that defines the service in the currently-open flow diagram by selecting the service and selecting **Service => Find Job** (*BMC Batch Impact Manger only*).

- Update the deadline for a service by selecting the service and selecting **Service => Update Deadline** (*BMC Batch Impact Manger only*)

- Open one of the following in read-only mode by selecting **Service => Properties**:

  - Job editing form of the BMC Batch Impact Manager job

  - Service definition (If the service was created from a Live rule, the rule definition appears).

- View or modify a service assumption by selecting **Service => Service Assumptions.** For more details about service assumptions, see the *Control-M Business Service Management Solution User Guide* (*BMC Batch Impact Manger only*).

Part 5

Analyzing and optimizing the production environment

This part presents the following topics:

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Chapter 26

Introduction to analyzing and optimizing production

This chapter presents the following topics:

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Analyzing and optimizing the system

After Control-M job scheduling has been implemented, you can analyze the system for problems such as bottlenecks (tasks running over their deadlines), resource shortages, poor workload balancing, and so on. Through analysis, you can identify the root causes of problems, and determine the potential impact of implementing changes, such as adding applications or changing resources.

Performing analyses can not only help you eliminate problems, they can help you optimize the system. The information provided in this part of the book deals with the task of analyzing and optimizing the system.

Where to go from here

Several tools are available to help you analyze your production environment.

- To generate reports about various aspects of the production environment, see Chapter 27, “Defining and generating reports.”.
- To archive each day’s processing events and then review them as needed, see Chapter 28, “Viewing and playing back archived data.”
- To determine the likely impact of potential changes to the system (for example, adding or deleting applications or resources), see Chapter 19, “Planning production with Control-M/Forecast.”

Chapter 27

Defining and generating reports

This chapter presents the following topics:

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Introduction

The Control-M Reporting facility enables you to define templates that you can use to generate reports that provide you with important information about your Control-M installation. The reporting facility uses the Crystal Report application to produce reports. Report files and report template files are saved locally as .rpt files.

You can include variables in report templates, and then supply the values for the variables when the report is generated. The report will then vary depending to the values you supply. (You supply the dynamic values using pop-up dialogs if you are working online, or in an Command Line Attributes / Arguments File if you are generating the reports in batch.)

NOTE

You can customize Control-M Reporting facility defaults. For details, see Appendix A, "Customizing the interfaces."

Available report types

Report types are categorized as follows:

- General — included in this category are the Alerts report and Audit report
- Definition — data for the report are taken from the Definition environment
- Active — data for the report are taken from the Active environment
- BIM — reports for sites operating BMC Batch Impact Manager
- Forecast — reports for sites operating Control-M / Forecast

For convenience, there is also an **All** category that lists all report types.

Available report types are described in this topic, grouped by category.

NOTE

- Several sample report templates are provided with the Control-M Reporting facility during installation. When you generate sample outputs using these templates, you might in some cases be prompted to supply input parameter values.

- In addition to the reports described in this topic, some reports (for example, the Forecast Analysis set of reports, including the Workload report and the Trend Analysis report) are available only if you purchased other BMC Software products, such as Control-M / Forecast. (Only administrators can run Control-M / Forecast reports). For details, see "Control-M / Forecast report types" on page 323.

Active report types

- Active Jobs report — lists all jobs and job details determined by selection and display criteria. It also includes a count of the number of jobs contained in the report. Note that multiple jobs having the same name can be in the same or different tables.

- Prerequisite Conditions report — lists conditions according to selection and display criteria. This report is also called the Conditions report. The report is similar to the information displayed when **Tools => Prerequisite Conditions** is accessed from Control-M/EM or Control-M/Desktop.

- Control Resources report — lists control resources and their attributes according to selection and display criteria. The information in the report is similar to the information displayed when **Tools => Control Resources** is accessed from Control-M/EM or Control-M/Desktop.

- Quantitative Resources report — lists quantitative resources and their attributes according to selection and display criteria. The report is similar to the information displayed when **Tools => Quantitative Resources** is accessed from Control-M/EM or Control-M/Desktop.

- Active Links report — shows the links (dependencies) defined between all jobs or between selected jobs, as determined by selection and display criteria. Global conditions are also included in this report. For example, you can list all the dependencies and global conditions that are defined in a specific data center, or only those defined between two groups.

- Active Manual report — performs validity checks and lists the In conditions in each active job that do not also appear as added OUT conditions in another active job. Although such conditions normally reflect manual conditions, they can also reflect omitted Out conditions, or misspelled In or Out conditions.

Definition report types

- Job Definitions report — lists all jobs and job details determined by selection and display criteria. It also includes a count of the number of jobs contained in the report. Note that in the case of multiple jobs, these can be from the same or different tables or SMART Tables.

- Table Definitions report — lists all tables and table details determined by selection and display criteria.

- Links Definition report — shows the links (dependencies) defined between all jobs or between selected jobs, as determined by selection and display criteria. Global conditions are also included in this report. For example, you can list all the dependencies and global conditions that are defined in a specific data center, or only those defined between two groups.

- Manual Definitions report — performs validity checks and lists any IN condition that is not defined as an OUT condition of another job. Though manual conditions normally have no corresponding OUT conditions, the listed conditions might nevertheless reveal omissions and spelling errors.

General report types

- Alerts report — lists alerts sent to the Alerts window.

- Audit report — lists the results of auditing Control-M/EM server for operations of a selected audit type. For example, changes in job and calendar definitions can be tracked.

- Users Authorization report — enables you to generate a report that lists the security definitions of a specific user or group. When you generate a report for a specific user, it lists the groups that user belongs to. The report lists security definitions for each user (and group) for the following items:

  — Job actions
  — Service actions
  — Service definitions
  — Privileges
  — Displayed Jobs and Tables
  — Job owners
  — Scheduling Tables
  — Calendars
  — Global conditions
  — Prerequisite conditions
  — Control resources
  — Quantitative rerouces

- Workload Distribution report — for each day, for each Control-M/Server, the report lists and includes the following counts from the day's data: total number of jobs, their breakdown by task type, node ID and application type, and the number of executions. The current day's figures are not included in the report.

- Extreme Peak Usage report — for a user-specified period, the report provides (according to the user request) one of the following sets of figures:

  — highest number of tasks and executions that occurred on a single day on a single Control-M/Server during that period, and their breakdown by task type, node ID and application type.

  — lowest number of tasks and executions that occurred on a single day on a single Control-M/Server during that period, and their breakdown by task type, node ID and application type.

  — the average number of tasks and executions to occur during that period, and their breakdown by task type, node ID and application type.

The report also includes summaries for the whole environment for the period, including the number of tasks and executions, by Control-M / Server.

- Managed Servers report — for a specified time period, the report lists all computers that are either hosting the various Control-M products software or are being used as computers for executing Control-M jobs.

  For each host, the report provides details of the computer's number of CPUs, CPU type, OS type and version. Additionally, a summary is included in the report which counts the number of hosts for each combination of number of CPUs plus CPU type.

NOTE

The summary in the Managed Servers report shows all hosts that are relevant to the specified time frame, so multiple details per host may be shown for multiple reports each one having a time frame that is part of a whole period.

BMC Batch Impact Manager report types

- SLA Analysis report — for a specified service, for a specified period of time, this report displays the number of executions that ended as follows: ended on time, ended late, or did not complete execution.
- History report — for a specified period of time, this report details which services executed, when they executed, and the execution completion status.
- Detailed Business Service report — for a specific service execution, this report provides a summary that includes the service name, date, completion status and related job details.
- Service–Jobs report — for a selected BIM service, this report lists its associated jobs in the Active environment. (This BIM report is an Active report type.)
- Jobs–Service report — for a selected job, this report lists its associated BIM services in the Active environment. (This BIM report is an Active report type.)

Control-M/Forecast report types

The following reports, which are useful for evaluating trends, are available in the Forecast Analysis section. These reports are available to administrators only.

- Workload report — lists the total number and names of jobs that ran during a specific time frame. The output is produced in both graphic and table formats.

- Trend Analysis report — lists the number of jobs that started during a specific time period in history, such as the first week of every month, or the last day of every week.

- Jobs Execution report — lists the jobs with information, such as start time, end time, and average run time. You can group job execution information by time segment.

Starting the Control-M Reporting Facility

Though you can generate reports in batch, it is much more common to work online, in the Control-M Reporting Facility window.

To start the Control-M Reporting Facility:

1 Do one of the following:

- From Control-M/Desktop or Control-M/EM GUI, select **Tools > Control-M Reporting Facility** and go to step 2**.**
- From the **Start** menu, navigate to **BMC Control-M > Control-M Enterprise Manager > Control-M Reporting Facility.**

2 Enter your user name and password, and click **Login**.

The Control-M Reporting facility window opens, displaying the Reporting Facility Start Page.

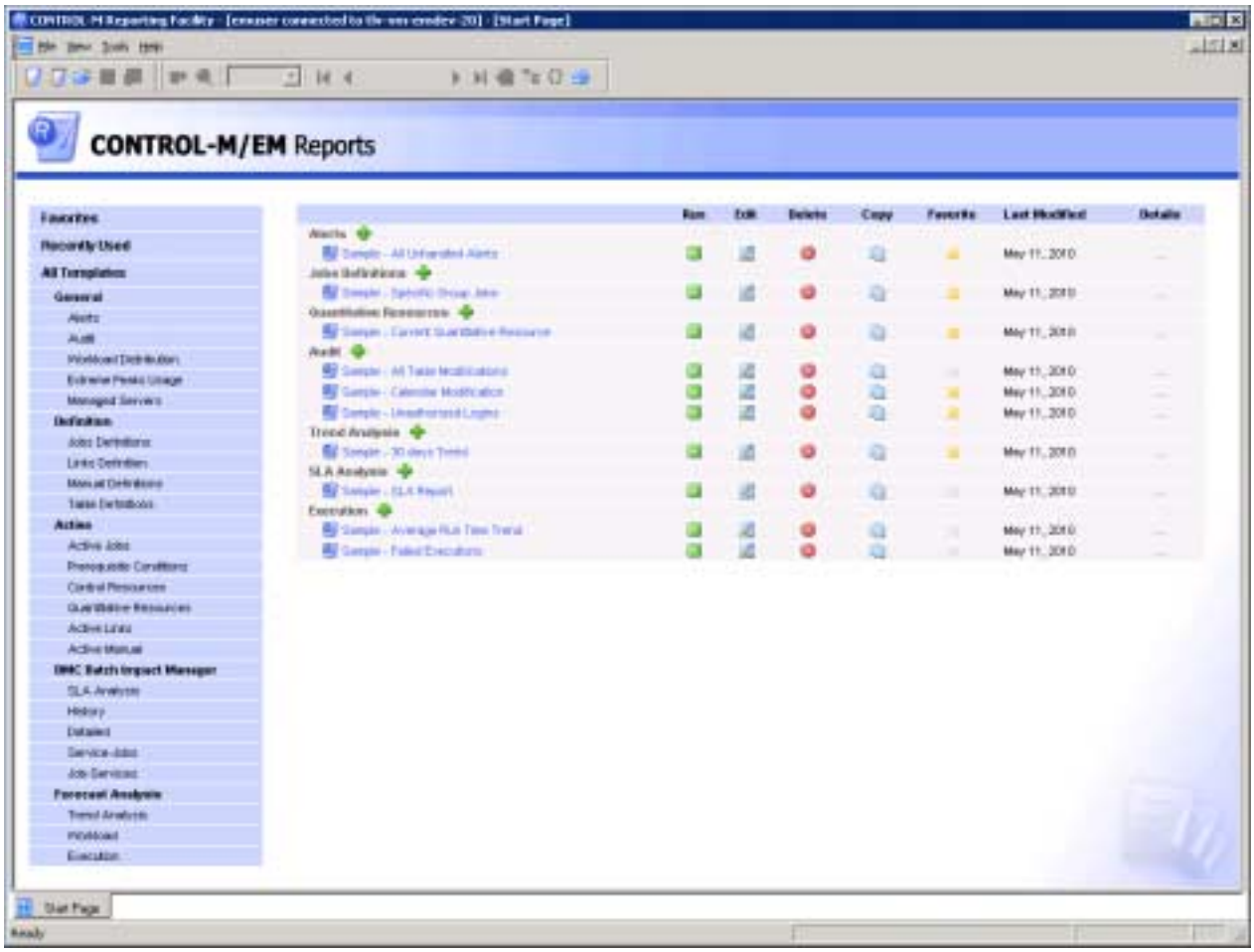
See Figure 18 on page 326.

TIP

In the left pane of the Reporting Facility Start Page you can filter the reports which are listed by the following criteria:

- Favorite report types
- Recently used report types
- All defined report types
- Filter by reports category/type

Figure 18 Reporting Facility Start Page window



The Reporting Facility automatically connects to the same database that the Control-M/EM server is using and to different Control-M/EM installations. However, if there are connectivity issues see "Reporting Facility connectivity errors" on page 398.

Generating a report

To generate a report

1 In the **Reporting Facility Start Page** click **Run** in the row of the report you wish to generate.

2 If the report was defined with variables that require input values at the time of report generation, the **Enter Parameter** dialog box opens. In this case, specify the parameter for each parameter listed in the **Parameter Fields** area.

A new report is generated from the template and displayed in the Report Preview Window.

NOTE

An asterisk following the report name in the tab in the task bar indicates that the data has not been saved (that is, the report is new or has been refreshed).

Displaying and working with reports

When you generate a report, it is automatically displayed in the Report Preview window. You can also display any previously run report that has been saved.

To open a previously run report

Choose **File => Open** from the toolbar and select a report.

The selected report is displayed in the Report Preview window, one page at a time. The Group Tree pane at the left displays the list of groups in the report.

In the Report Preview window, you can do the following:

Task	How to
refresh the data displayed in the report	Click the Refresh button ( ), or choose **Edit => Refresh Report Data**
toggle between showing and hiding the Group Tree	Click the toggle button ( ) or choose **View => Group Tree**
jump to the display for a particular group in the Report pane	Click its name in the Group tree.
navigate through report pages	Click the First ( ), Back ( ), Next ( ), and Last ( ) navigation buttons as needed.
go to a specific report page	Choose **Edit => Go To**.
perform a text search	Choose **Edit => Find**.
export the report	Choose **File => Export**. (Alternatively, you can use the **emreportcli** utility. For details, see "Generating and exporting reports in batch" on page 336.) **Note:** Exported reports are saved locally, and can later be imported into other reporting applications or data manipulation tools.
save your current report definition in a report template	Choose **File => Save As Template**.

Defining templates and Ad Hoc reports

You define templates and ad hoc reports using the Report Wizard. The Control-M Reporting facility supplies a fixed, pre-defined set of report types (for example, Alerts and Audit reports), and each template or report that you define must be of one of these pre-defined types. When defining templates and reports, consider the following:

- If you expect to run the report only once, you can create the report definition without defining a template. This is called an Ad Hoc report. "To create an Ad hoc report" on page 329.
- If you expect to generate the report more than once, you can define a report template. See "To create a report template" on page 329.
- If you plan to use different source data criteria (for example, a different source Control-M, or different filtering criteria) whenever you regenerate the report, you can
  - define dynamic parameters that enable you to specify the desired sources at runtime, or
  - define a different report template for each data source (so that runtime input is not required).

TIP

The Reporting Facility Start Page has several icons aligned in the rows of the various report types. You can perform the following tasks by selecting a reports row using the icons:

- Run a report using the **Run** icon.
- Edit a template using the **Edit** icon.
- Delete a template using the **Delete** icon.
- Copy a template using the **Copy** icon.
- Indicate a template as a favorite by clicking the star icon in the **Favorite** column.

To create an Ad hoc report

1 In the Reporting Facility **Start Page**, choose **File => New => Ad Hoc**.

The New Ad Hoc dialog box opens. The left pane displays several report categories representing different types of data environments (for example, **Active** or **Definition** environment). The right pane displays the report types available for a particular category. The report type display varies according to the selected category. For a brief description of available report types, see "Available report types" on page 320.

2 In the left pane of the New Ad Hoc dialog box, select the appropriate category (select **All Reports** to display all report types in the right pane). Then, in the right pane, select the report type.

3 Fill in the fields of the Report Wizard panels. Most fields on most panels are self-explanatory. For information on using the Report Wizard see "Creating templates using the Report Wizard" on page 330.

4 When you have finished defining the report, if you decide you want to save it as a template, click the appropriate field in the **Report Details** panel and specify a name for the template.

To create a report template

1 Do one of the following:

— Click **File => New => Template**
— Click the **New Template** icon on the toolbar
— Click the **Add** icon next to one of the report types. Go to step 3.

The New Template dialog box opens. The left pane displays several report categories representing different types of data environments (for example, **Active** or **Definition** environment). The right pane displays the report types available for a particular category. The report type display varies according to the selected category.

For a brief description of available report types, see "Available report types" on page 320.

2 In the left pane of the **New Template** dialog box, select the appropriate category (select **All Reports** to display all report types in the right pane). Then, in the right pane, select the report type.

3 Enter a name for the report (template) that you are creating and click **OK**.

The first panel of the Report Wizard (the **General** panel) is displayed.

4 Fill in (or modify) the fields of the Report Wizard panels.

5 Most fields on most panels are self-explanatory. For information on using the Report Wizard see "Creating templates using the Report Wizard" on page 330.

Creating templates using the Report Wizard

The following section describes the panels of the Report Wizard and how to use the wizard to create a template. To begin creating a template or Ad Hoc report, see "To create a report template" on page 329 or "To create an Ad hoc report" on page 329.

Topics in this section include:

- "General panel" on page 330
- "Data Source panel" on page 331
- "Filter panel" on page 331
- "Fields panel" on page 333
- "Grouping panel" on page 333
- "Summaries panel" on page 334
- "Sorting panel" on page 334
- "Style panel" on page 334
- "Report Details panel" on page 335

Several Report Wizard panels contain unique fields for certain reports. The following sections describe these fields:

- "Data Source panel for the Active Links report" on page 335
- "Filter panel for the Links Definition report" on page 335
- "Filter panel for the Audit report" on page 336

General panel

The General panel is used for defining general information about the report.

To fill in the General panel

Specify a report title, author, and a general description. When filling in the description, press **Ctrl + Enter** to move to the next line in the description area. Both the title and general description will appear at the beginning of the report.

Data Source panel

The Data Source panel is used for defining from where (which Control-Ms) the report data is taken. This panel is only displayed for Active report types.

NOTE

The Data Source panel for the Active Links report has special features. For details, see Data Source panel for the Active Links report.

To fill in the Data Source panel

1 From the source list of Control-Ms on the left, select the name of the source Control-M, and click the right arrow to move it to the target list. Repeat as needed. (You can remove a Control-M from the target list by selecting it and clicking the left arrow.)

2 To add a mask

A Select the Control-M in the target list and click **Add Mask**.

The Add Mask dialog box is displayed.

B Specify the Control-M name mask using * and ? wildcards.

3 Repeat Steps 1 and 2 for each Control-M to be added as a data source.

4 Select from which network the report data will be loaded:

- Current Active network
- Latest Archived Network
- Archived Network from the selected date

Filter panel

The Filter panel is used to specify the filtering criteria for which data are retrieved.

NOTE

The Filter panel for the Links Definition report has special features. For details, see Filter panel for the Links Definition report.

The Filter panel for the Audit report also has special features. For details, see Filter panel for the Audit report.

To fill in the Filter panel

1 In the **Field Name** field, select the field that you want to use for filtering. You can specify the same field name on more than one line.

2 In the **Operator** field, select the operator (for example, **=** or **>**) to be used with the value specified in the next substep.

NOTE

The **LIKE** and **=** operators work the same, except that
- the **=** operator treats * and **?** characters specified in the value as literals
- the **LIKE** operator treats ***** and ? characters specified in the value as wildcards

3 If the value to be used for filtering on the field should be dynamically specified when the report is run, click **Param**.

In this case, the **Value/Param Name** field defines the parameter name to be used to prompt you for a value at run time. And by default (that is, if no previous **Value/Param Name** was set as the default), the **Value/Param Name** field value will automatically be set to the **Field Name** (for example, **Odate**).

You can modify the value in the **Value/Param Name** field.

4 If you did not click **Param**, specify in the **Value/Param Name** field the value to be used for filtering the field. The **Value/Param Name** field allows you to specify ***** and **?** wildcards, the **!** symbol for **Not** logic, and the **,** symbol for **Or** logic.

Example

```
Jobname LIKE A*,B*
Application LIKE !APPL*
```

Explanation: Retrieve all jobs whose jobname begins with **A** or **B**, but whose application names do not start with **APPL**.

NOTE

If you specify wildcard or special logic symbols in the **Value/Param Name** field, you must set the operator to **LIKE** (or these symbols will be treated as literals).

5 Click **Fix** for any entries that you want to appear in the panel the next time you create a new report or template of this type.

6 Repeat steps 1 through 5 for each field that should be used for filtering. **And** logic is assumed between multiple lines (fields).

Fields panel

The Fields panel is used to define which report fields will appear in the report.

To define the fields to be in the report

1 Select the field in the source (left) list box, and click the right arrow to copy it to the defining (right) list box. (To remove a field from the report, select it in the right list box, and click the left arrow.)

2 Repeat step 1 for each field that should appear in the report.

TIP

To move a field up or down (that is, to re-sequence fields) in the target list, select the field (in the target list), and click the up or down arrow above the list or drag the field.

Grouping panel

The Group By panel is used to define by which fields the report rows will be grouped.

Group By criteria should not be confused with Sort criteria (defined in the next panel). Group By criteria provide the following functionality:

- Group By criteria create branches and sub-branches in a navigation tree.
- Group By criteria supersede Sort criteria. That is, data are first organized according to Group By criteria, and only then, within the lowest group, are they sorted according to Sort criteria.

To define Grouping criteria

1 Select the field in the source (left) list box, and click the right arrow to copy it to the target (right) list box. (To remove a Grouping criterion, select it in the right list box, and click the left arrow.)

2 Repeat Step 1 for each field that should be used for grouping.

NOTE

The Grouping panel defines a grouping hierarchy. A Grouping field lower down in the target list is a subgroup of a Grouping field higher up in the target list.

TIP

To move a field up or down (that is, to re-sequence the fields) in the target list, select the field (in the target list), and click the up or down arrow above the list.

Summaries panel

The Summaries panel is used to define if a group defined in the Grouping panel will display a summary of all records in that group in the report. The summary will appear in the summary field and a graph can also be displayed in the report. If a group has not been selected all fields in the Summaries panel will be disabled.

1 In the **Summary by field, Summary for group** and **Summaries Function** fields, select a value from the drop down menu.

2 To display the summaries in a chart click the **Show Chart** box and select the type of chart you want displayed in the report.

3 Define a title for the chart (optional).

4 Click Next to continue to the next panel or Finish to display report.

Sorting panel

The Sort panel is used to define by which columns the report will be sorted. You can specify up to three sort fields in ascending or descending order.

1 In the Sort By field, select the field to sort on, and click whether the sort should be in ascending or descending order.

2 Optionally, repeat the process for the second and third sort fields.

Style panel

Predefined report styles are provided with the product. The Style panel is used to select in which style the report will be displayed. When you select a style, it appears in a preview area in the panel, enabling you to determine whether you want to keep your selection or select a different style.

Select the style and check the results in the Preview area. Change the selection if you do not like the results.

Report Details panel

The Report Details panel provides a summary of your report definition.

(The Report Details panel has different fields at the bottom if you are defining a report definition instead of a report template.)

1 To run the report immediately upon exiting the Report Wizard, click the **Yes** selection button near the bottom of the panel.

NOTE

The **Yes** or **No** value you choose is saved and used as a default the next time you edit a template in the Report Wizard.

2 Click **Finish**.

The template is defined and saved. You can use it whenever you want to run the report.

Data Source panel for the Active Links report

The Data Source panel for the Active Links report has a check box called **Produce Global Links Report**. If this box is checked, the Control-M list areas appear twice; otherwise, they appear once.

1 To produce a Global Links report

A Ensure this check box is checked.

B In the top list, indicate the source Control-Ms.

C In the bottom list, indicate the target Control-Ms.

In this case, the output is generated according to the Global Links definition.

2 If you do not want to produce a Global Links report, ensure that this check box is not checked.

3 Fill in the rest of this panel.

Filter panel for the Links Definition report

The Filter panel for the Links Definition report has a **Produce Global Links Report** check box.

To produce a Global Links report

1 Ensure that the **Produce Global Links Report** check box is checked.

2 Fill in the rest of this panel.

Filter panel for the Audit report

The Filter panel for the Audit report contains special fields, **Audit Type** and **Audit Operation**.

1 In the **Audit Type** field, select which type of Audit data should be retrieved, or select **<All>** if all Audit types should be included.

2 In the **Audit Operation** field, select for which type of Audit operation data should be retrieved, or select **<All>** if all operations of the selected Audit type should be included.

The available list of operations changes according to the selected Audit type. The list of Field Names changes according to the selected operation. If **Audit Type <All>** is selected, the **Audit Operation** field is disabled.

3 Fill in the rest of this panel.

Generating and exporting reports in batch

The **emreportcli** command line utility generates reports in a selected format. This utility runs only on Microsoft Windows in batch mode.

NOTE

You must specify Control-M/EM server login information when you invoke this utility.

Either of the two following options can be used to activate the emreportcli utility:

- Parameters can be entered as command line parameters
- An input arguments file can be generated with XML specifications

Using command line parameters

The emreportcli utility can be activated by entering command line parameters as follows:

```
emreportcli {-u <user> -p <password> | -pf <password file>} -s <server
host name>

-template  <templateName>

[-template_path <template path>]

-output_file_type EXCEL | EXCEL_DO | DOC | PDF | HTML |
XML | CSV | TABBED

-output_file_path <output file path>

[-param <name>=<value>]…
```

The parameters in this command are described in Table 64 and Table 65..

Table 64 emreportcli report generation utility parameters

Parameter	Description
emUser	Control-M/Enterprise Manager user name.
emPass	Control-M/Enterprise Manager user password.
passwordFilename	Flat file containing an unencrypted username and password in the following format: user=*username* password=*password* **Note:** If both **-U** and **-pf** are specified, an error message is generated. If neither is specified, an online prompt is issued for the Control-M/EM database owner name and password.
emServer	Host name of the Control-M/EM Server. **Note:** To address a GUI Server when multiple GUI Servers exist, set this parameter to the logical name of the relevant GUI Server.

Table 65 emreportcli parameters

Element	Attribute	Description
OutputFile		The report output file.
	type	Specifies the type of the output file, such as EXCEL, EXCEL_DO (for data only), PDF, DOC, HTML, TXT, or XML.
	file path	Specifies the full filename of the output file.
Param		Specifies the mane and value for each parameter in the form *name=value***.** Wildcard can be used for text fields.
Template		Specifies the name of the template.
	path	Specifies the folder in which the template file is located.

Input arguments file

Input for the utility is an arguments file containing the XML specifications for the report to be generated, including all required parameters. The following sample XML arguments file is provided at *em_home*\Data\Reporting\sample_args.xml. A list of required elements and values for the arguments is provided in the DTD file: *em_home*\Data\Reporting\emreportcli.dtd.

The emreportcli input arguments file parameters are described in Table 66.

Syntax

```
emreportcli {-u <user> -p <password> | -pf <password file>} -s
<server name> -arg <XML file name>
```

NOTE

If you are using only a client installation you must include the 'bin' directory in the file path. For example:

```
c:\Program Files\<Instance Name>\bin\emreportcli.exe {-u <user> -p
<password> | -pf <password file>} -s <GUI Server Name> -arg <arguments
file>.xml}
```

Table 66 emreportcli utility input arguments file description

Element	Attribute	Description
SourceFile		The template used to generate the report.
	templateName	specifies the name of the template
	templatePath	specifies the folder where the template file is located (Optional)
OutputFile		The report output file.
	type	specifies the type of the output file, such as EXCEL, EXCEL_DO (for data only), PDF, DOC, HTML, TXT, or XML
	filePath	specifies the full filename of the output file (which will be overwritten if it previously existed) **Note:** The following dynamically resolved keys can be included when specifying the filepath attribute: **{date}**, **{time}**, and **{counter}**. For example ■ For **filepath=D:\Test.doc** (that is, no key), the output file is: **D:\Test.doc**. ■ For **filepath=D:\Test-{date}.doc**, the output file is **D:\Test-May22, 2008.doc**. ■ For **filepath=D:\Test{counter}.doc**, the first output file is **D:\Test1.doc**, and the next output file is **D:\Test2.doc**.
Parameters		The parameter list.
Parameter		An individual parameter, whose name and value is specified.
	name	name of the parameter as defined in the report template filter panel
	value	value of the report parameter (wildcard characters can be used for text fields when the field operator in the filter panel is set to "LIKE" for the fields)

EXAMPLE

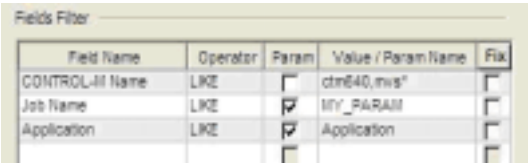
```
<!DOCTYPE ReportDefinitions SYSTEM "emreportcli.dtd">
<ReportDefinitions>
       <ReportDefinition>
              <SourceFile templateName="alerts3"/>
              <OutputFile type="PDF" filepath="D:\MyAlerts3.pdf"/>
              <Parameters>
                    <Parameter name="MY_PARAM" value="job*"/>
                    <Parameter name="Application" value="a*"/>
              </Parameters>
       </ReportDefinition>
</ReportDefinitions>
```

With the input arguments file in the above example, the **emreportcli** generates a PDF report based on the “alerts3“ report template and saves it in the **D:** folder with the filename called **MyAlerts3.pdf**.

If the report template filter is defined as shown in Figure 19, the output of the report will contain all alerts with a

- Control-M name of "ctm640" or that starts with "mvs"
- Job Name that starts with "job"
- Application name that starts with "a"

Figure 19 Report template filter definition



The last two field filter values are set dynamically from the XML arguments file.

To use the emreportcli report generation utility

1 Open a command prompt window.

2 Enter the following command and press **Enter**.

```
emreportcli [{(-U emUser -P emPass) | -pf passwordFilename}]
-s emServer -arg xmlArgumentsFile
```

The *xmlArgumentsFile* is the full path name of the input arguments file.

NOTE

You can specify the user name and password on the command line, in a password file.

Chapter 28

Viewing and playing back archived data

This chapter presents the following topics:

Selecting and displaying archived ViewPoints 342
Playing back archived events 343

The Active Net consists of the data, conditions, and resources of jobs that occur in the Active Jobs file of a data center during the current day.

NOTE

In this context, the term “day” refers to the period between runs of the New Day procedure on a Control-M/Server. Each run begins a new day.

At the beginning of each day, Control-M/EM automatically archives the previous day’s Active Net from each data center. These Archived Nets include the recording of job changes, which can be played back much like a video recording.

The Archived ViewPoints and Playback features enable you to review the information stored in Archived Nets, as follows:

- **Archived ViewPoint** provides a static display of the jobs at the end of a day.
- **Playback** provides a simulation (much like a recording) of production environment events — the jobs that ran and their status changes, during a day.

This information can help you review, track, and analyze problems of previous days. For example, the system manager might use these features every morning to review the previous night’s events.

Users must have authorization to use these features.

Selecting and displaying archived ViewPoints

To Select and display archived ViewPoints

1 In the Control-M/EM GUI, select **File => Open Archived ViewPoint**, which displays the Nets list.

NOTE

In the Archived Net listings, the **Start Time** and **End Time** values are taken from the computer where the Gateway ran. Their date values can differ from the listed **Date** value — for example, due to time zone or New Day procedure differences.

2 Select the Control-M server, and then select a Net from the **Nets** list, and click **Next**, which displays the list of available ViewPoints.

3 Select the ViewPoint to be displayed.

4 To filter the jobs that will be displayed in the archived ViewPoint, click **Dynamic Filter**. For information on Dynamic Filtering, see "Defining dynamic filters" on page 240.

5 Click **Finish**.The selected archived ViewPoint is displayed in the Control-M/EM GUI.

Many functions available for regular ViewPoints are available for archived ViewPoints.

NOTE

- If the total number of Archived jobs in the GUI server exceeds the value specified in the **LimitArchiveJobsInMem** system parameter, the ViewPoint will not be displayed. For more information, see the *Control-M Administrator Guide*.
- Only one Archived Net can be opened at a time in the Archive ViewPoint window. However more than one ViewPoint showing information from the same Archived Net can be displayed at one time, using the **View => View Selection** and **Neighborhood => Open ViewPoint options**.
- **SYSOUT** and **Log** functions are available only if there is communication between Control-M/EM and the respective Control-M/Servers. For z/OS, the functions are only available for jobs running under Control-M for z/OS version 6.2.00 or later. SYSOUT will be available for other Control-M jobs in Control-M 6.2.00 or later.

Playing back archived events

The Playback feature provides a toolbar for playing back production events in the displayed archived ViewPoint. It enables you to review events from a specific time, second by second, or from event to event, at the speed you require.

To use the Playback feature

1 If the archived ViewPoint is not displayed, select and display it. For instructions, see "To Select and display archived ViewPoints" on page 342.

2 In the Control-M/EM GUI, click or choose **Tools => Playback**, which adds the playback toolbar to the Control-M/EM GUI window.

3 Select the playback speed by selecting the number of units and the unit type (*number* of *units*/step) in the Speed combo-box fields.

4 Click Play ( ).

To intervene in the playback, you can use the other buttons and the slide control. You can also enter a specific time in the **Time Display**, and click **Go**.

NOTE

- If the **Alerts** window opens during Playback, it displays alerts from the current production environment and not from the archive that is currently being played back. This ensures that the user is always notified when an alert occurs even while the user is using the Playback Facility.
- **Hold**, **Free**, **Delete**, **Undelete**, and **Zoom and Save** changes are not displayed in playback because they are not saved in the playback recording.
- During playback, jobs not yet ordered to the Active Jobs file have the status **Not in AJF**. This status is relevant to archived jobs in Playback only.

Part 6

Appendixes

This part presents the following topics:

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Customizing the interfaces. 347

Appendix B
Examples for defining jobs. 369

Appendix C
Formats, values and functions. 387

Appendix D
Checking job and table processing definition validity 393

Appendix E
Troubleshooting. 395

Customizing the interfaces

This appendix presents the following topics:

Changing your password 347
Adjusting list displays 347
Modifying list displays 348
Customizing default options 351
Setting options for Control-M / Desktop 351
Setting options for Control-M / EM 359
Setting options for the Control-M Reporting facility 366

Changing your password

To change your password for the Control-M/EM GUI, Control-M/Desktop or Control-M Reporting facility window

While displaying the window, choose **Tools => Change Password**, and in the Change Password dialog box, fill in your current and new password details and click **OK**.

Password changes made in one application window (for example Control-M / EM) automatically apply to the other application windows.

Adjusting list displays

Certain dialog boxes display lists of items (for example, lists of Control-M definitions or lists of prerequisite conditions) from which you can make a selection. Many list displays contain an Item counter at the bottom that indicates the number of items appearing in the list.

You can modify many list displays, and perform other tasks in list displays. Two pop-up menus enable the various modification and other tasks:

- Column header pop-up menu
- List display pop-up menu

To display the column header pop-up menu

Right-click in the header of the column in the list display.

Figure 20 Column header pop-up menu for list displays

This menu is used for performing most modifications. Changes made are saved and re-displayed the next time the list is displayed.

To display the list display pop-up menu

Click anywhere in the list display except the column header.

Figure 21 List Display Pop-up Menu

Modifying list displays

The following modifications can be made to list displays:

- Toggle the Item Counter on and off
- Sort the list according the values in a column
- Remove a column from the list
- Add fields to the list display
- Resize a column's width
- Reorder columns

Toggling the item counter is performed from the list display pop-up menu. The other modifications are performed from the columns headers or the column header pop-up menu.

NOTE

Not all list displays can be modified, and not all modifications are possible in modifiable list displays. Furthermore, some modifications require Administrator permissions.

To display or hide the item count in a list display

Click **Item Count** in the list display pop-up menu.

To sort the list according to the values in a column

Perform one of the following:

- Right-click the column header. Select **Sort Ascending** or **Sort Descending**.

  -or-

- Click the column header.

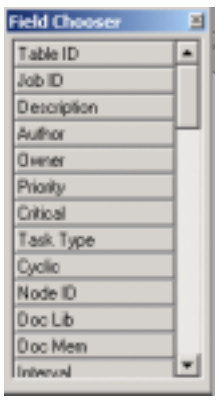
The selected column initially sorts in ascending order (default). Once the column is already being used as the sort column, each click of the column header toggles between ascending and descending sort.

An alphabetic sort is performed, except the **Last Update** column is sorted by date. The date format is determined by the locale setting of the computer. For information about how to change the date format, see the manual of your operating system.

To add a field to the display

1 Right-click the column header. Select the **Field Chooser** option.

The Field Chooser menu is displayed with the appropriate fields.



2 Click and drag the field from the **Field Chooser** menu to the wanted location in the column header of the list.

To remove a field from the display

Perform one of the following:

- Right-click the column header and select **Remove This Column**.
- Right-click the column header and select the **Field Chooser** menu. Then drag the header from the list to the Field Chooser.

To rearrange the fields in the display

Click and drag (right or left) the column header of the field to be moved.

To resize a column in the display according to its best fit

Perform one of the following:

- Right-click the column header of the column to be adjusted and select **Best Fit**.
- Double-click the header's right border.

  The column width is adjusted to fit the longest value in the column.

Performing other tasks in the list display

You can perform the following tasks from the List Display pop-up menu, which is displayed by right-clicking anywhere in the list display (except the column header).

- Save the contents of the list display to a CSV file
- Print the contents of the list display

To save the contents of a list display to a CSV file

Select **Export to File** in the pop-up menu of the list display, and perform the save in the Export to File dialog box.

.csv files are comma-delimited and can be used in applications such as Microsoft Excel.

To print the contents of a list display

Select the **Print** option in the pop-up menu of the list display.

Customizing default options

You can customize various default options for Control-M/Desktop, Control-M/EM, and the Control-M Reporting facility.

To customize default options

1 Depending on the window you want to customize, in the Control-M/EM GUI, the Control-M/Desktop window, or the Control-M Reporting Facility window, choose **Tools => Options**.

2 Select the appropriate panel, change the defaults, and click **Ok**.

Default options are described in the following sections.

Setting options for Control-M/Desktop

This section presents tables with setting options for the following defaults:

- General defaults
- Workspace defaults
- Flow diagram defaults
- Diagnostic defaults
- Confirmation defaults
- Forecast defaults

General defaults

Table 67 General settings (General panel) (Part 1 of 3)

Field/option	Default to be set
Click **Always check the validity of jobs**	Control-M/Desktop should automatically check the validity of parameter values as they are entered in the job editing form. **Note:** If set to No (that is, not clicked), perform validity checks on all jobs in a draft using the **Tools => Validity Checks** option. For more information, see Appendix D, "Checking job and table processing definition validity."
Display Tool Tips	Display a tool tip whenever Control-M/Desktop is started.
{Counter}	Default number of jobs to be created using the Mass Job Create and Find and Update facilities. For more information, see Chapter 10, "Creating and updating many jobs at once."

Table 67 General settings (General panel) (Part 2 of 3)

Field/option	Default to be set
Click **Enable Undo,** and in the **Undo Size field,** set the number of actions that can be undone or redone (Default: 100).	Enable actions performed in the Job Editing form to be undone or redone.
Display Time Synonym	Normally, time parameters (examples: Time from, Time until, Shout Late time) allow you to specify times ranging from 00:00 through 23:59 hours. However, if you check this option, you can specify time periods ranging from New Day time until New Day-plus-23:59. Example: If New Day time is 7:00 AM, this option allows you to specify a range from 07:00 until 30:59. **Note:** The Time Synonym option exists in Control-M / Desktop, Control-M / EM and the Control-M Reporting facility. Anytime you change this option in one of these windows, the option is automatically changed in the other windows.
List all templates	Determine the type of templates displayed in the template list box in the job editing form. ■ Leave the check box blank to display the list of job scheduling definition templates only (default). ■ Click the check box to display the list of both job scheduling definition templates in the job editing form and table templates in the table editing form.
Use compact Step Codes grid	**On/Do** lines will be displayed in a single row in the **Step Codes** grid.
Connection Mode	How Control-M / Desktop should connect to Control-M / EM. Select one of the following: ■ **Automatic Connection**. Control-M / Desktop opens and closes the connection as necessary depending on selected actions. ■ **Manual Connection**. Control-M / Desktop maintains an open connection with the Control-M / EM GUI Server until the user closes the connection.
Resolve job's Author field conflict	How to handle situations where the name of the user performing a Write to Control-M / EM does not match the name of the Author. Select one of the following: ■ **Change Automatically** — check this value if the author should automatically be reset without prompting the user for confirmation. ■ **Prompt Before Changing** — check this value to have Control-M / EM prompt the user for confirmation before changing authorship. Default. For more information, see the Security chapter in the *Control-M Administrator Guide*.

Table 67 General settings (General panel) (Part 3 of 3)

Field/option	Default to be set
Keep table locked (in local workspace)	Keeps the table locked after writing the table to Control-M/EM Server in the local workspace. This prevents other users from editing the table between the write actions of the original user. The default is unchecked, meaning the table is unlocked once a write action is performed.
Default Start Day of the Week	First day of the week for use in the Week Days field in the job editing form. **Note:** This is the default value used for all data centers. A Start Day of the Week can also be specified for each Control-M using the Control-M Definition window. The value in the Control-M definition window overrides the default value specified in the Options dialog box.
Write before upload (in local workspace)	Automatically updates the Control-M/EM database before updating the Control-M database when you perform an upload.
Help Language	Click **Use local language.**

Workspace defaults

Table 68 Workspace settings (General – Workspace panel)

Field/option	Default to be set
Open 'Load Jobs' dialog when opening a new workspace	Open the Load Jobs dialog box when you start Control-M/Desktop.
Default Workspace	Default workspace when you start Control-M/Desktop: **Local** or **Online**.
Local Workspace Background **Online Workspace Background** **Forecast Workspace Background**	Color settings.

Flow diagram defaults

Flowdiagram – General panel

Table 69 General flow diagram settings (Flowdiagram – General panel)

Field/option	Default to be set
Graph Placement	Placement of parent job node in the flow diagram (right, middle, left). Default: **Parent in the Middle**.
Click **Maximize Downward Flow**	Flow diagram should be displayed as much as possible in vertical alignment rather than in horizontal alignment.
Click **Minimize Graph Width**	Flow diagram should accommodate the available screen space.
Start Zoom Level	Default magnification percentage of nodes displayed in Flow Diagram view when viewing a new network.Valid values are 10 through 400.

Flowdiagram – Nodes panel

Table 70 Flow diagram node settings (Flowdiagram - Nodes panel)

Field/option	Default to be set
Node Title	Information to be displayed in the title bar of the node. Default: **MemName** **Note:** If JOB_NAME / MEMNAME is selected for: ■ z / OS jobs —Mem Name is displayed ■ other jobs — Job Name is displayed
First Field	Information to be displayed in the first field of the node body. Default: **Control-M Name**
Second Field	Information to be displayed in the second field of the node body. Default: **Control-M Name**
Wrap field text in node	Information in the job node should wrap to the next line. If not selected, the fields are truncated if necessary.
Node shape	Shape for nodes in the Flow Diagram. Select one of the following: ■ **Rounded** — displays nodes with rounded corners. ■ **Rectangle** — displays nodes with square corners.
Double Click on item to:	Function to be performed if a node is double-clicked in the Flow Diagram. Select one of the following. ■ **Expand-item** — Expand or Collapse function. Expands the selected node to display levels lower than the current selected node, or collapses the selected node to hide all lower levels. **Note:** This option is not available when condition nodes are displayed. ■ **StepInto-Item** — Step In function. Changes the Flow Diagram to display nodes one level lower than the current selected node. For more information, see "Focusing on different level nodes (stepping in and stepping out)" on page 37.

Flowdiagram – Links panel

Table 71 Flow diagram condition settings (Flowdiagram – Links panel) (Part 1 of 2)

Field/option	Default to be set
Display Condition nodes	Condition nodes should be displayed in the Flow Diagram.
Display Do-Conditions (as dotted links)	Conditions created using the **Do Condition** parameter should be displayed. The link is indicated with dotted lines.
Display links behind nodes	When selected, displays the connecting lines (that represent the conditional links between jobs) behind the job nodes.
Display Out Conditions with minus sign (as dotted links)	**Out Conditions** that get deleted should be displayed. The link is indicated with dotted lines.
Display Optional In Condition as	How optional In conditions (for example, two In conditions separated by an OR operator) will be displayed —with solid or dotted lines.

Table 71 Flow diagram condition settings (Flowdiagram – Links panel) (Part 2 of 2)

Field/option	Default to be set
Add Out condition with minus sign when creating job dependency	Automatically create Out conditions to delete the In conditions that you automatically create by dragging between nodes in the Control-M / Desktop flow diagram.
Condition format	Default condition format to be used when you create job dependencies by dragging between job nodes in the Control-M / Desktop flow diagram.
Delete only IN cond	Delete the In condition when **Delete Dependency** is selected from a condition line pop-up menu.
Delete IN, OUT conds	Delete both the In condition and the Out condition when **Delete Dependency** is selected from a condition line pop-up menu.
Ask what to delete	Display the **Delete Dependency** dialog box. Default.
Automatically inherit job's conditions if deleted	By default, when you delete a job from the flow diagram, you effectively sever the connection between the deleted job's predecessor and successor jobs (because the In condition required by the successor job is no longer created by the deleted job). However, by checking this option, you can ensure that Control-M / Desktop maintains the connection. In this case, Control-M / Desktop automatically ■ removes the dependency between the deleted job and its successor (by removing the Out condition of the deleted job and the In condition of the successor job that created the dependency). ■ creates a dependency between the predecessor and successor jobs of the deleted job (by adding as an In condition in the successor the Out condition of the predecessor). This option works only when you are working in a Local workspace, and only if you delete one job at a time. If you delete multiple jobs in a single delete action, the connection is lost regardless of the setting.

Flowdiagram – Colors panel

Table 72 Flow diagram color settings (Flowdiagram – Colors panel)

Field/option	Default to be set
(background)	Background color settings are found in the General-Workspace panel.
Group/Application	Color for all level nodes in the hierarchy.
Connector	Color for In / Out condition triangles.
Frames	Color for frames of nodes in Flow Diagram view and in Net Overview.
Condition Nodes	Color for condition nodes.
Dependency	Color for links (unselected).
Selected link	Color for a link that has been selected.
Focused Node	Color of the currently focused node.
Node Title	Color for the node title.
First Field	Color for the first field displayed in the node.
Second Field	Color for the second field displayed in the node.

Diagnostic defaults

The Diagnostics panel helps troubleshoot technical problems with Control-M / Desktop by printing diagnostics at the selected severity levels into a log file. The log file should then be sent to BMC Software Customer Support.

NOTE

Use this panel only when instructed by BMC Software Customer Support. Your technical support representative will notify you which fields to change.

NOTE

The changes to the settings take effect immediately, except for changes made to the Cyclic Log File field(s). Changes to Cyclic Log File field settings take affect the next time the specified Control-M / Desktop application files are run.

Table 73 Diagnostic settings (Diagnostic panel) (Part 1 of 2)

Field/option	Default to be set
Log File Name	Full name and path of the log file to which diagnostics should be printed. For display purposes only.
Enable Diag	Print diagnostics to a log file. Default: Selected.

Table 73 Diagnostic settings (Diagnostic panel) (Part 2 of 2)

Field/option	Default to be set	
Use Minimum Diag Level	Diagnostic Level. Print all diagnostics to the log at the selected diagnostic level or higher, even if diagnostic levels specified in the Diagnostic Levels fields (see below) are lower than the value specified here. Values can be selected from the list, or entered manually (keyword or numeric code). Default: 1 ERROR. Valid values are:	
	0 SEVERE	Only severe issues (crashes).
	1 ERROR	Error messages (CORBA exceptions, errors that can cause the application to malfunction or crash at a later time). Default.
	2 WARNING	Warning messages (unexpected events that do not stop the application but might limit functionality.
	3 (General)	General events.
	4 INFO	Information about the basic functionality of the application.
	5 DEBUG	More detailed information including the steps of an event, parameters, etc.
	6 FNC_ENTER	Every entrance to a function / method.
	7 FNC_EXIT	Every exit from a function / method.
Cyclic Log File	(When checked) Print diagnostics to a set of log files (instead of one). Default: Not checked.	
Number of Files	Maximum number of files to which diagnostics are printed. Valid values: 1-300. Default: 1.	
Number of Messages Per File	Maximum number of messages that can be written to each cyclic log file. Valid values: 200-10000. Default: 200. Control-M / Desktop overwrites the existing log files (starting with the first in the set) if more diagnostics are generated than fit in the defined number of cyclic log files. Changes to these fields take affect the next time the specified Control-M / Desktop application files are run (not immediately).	
Diagnostic Levels	Individual diagnostic level settings for each file or context (procedure). See the **Use Minimum Diag Leve**l field for valid values.	
Contexts tab	Generate diagnostics on a procedural basis, at the level specified next to each context (procedure). Procedures listed in the Contexts tab can span several files or sub-procedures. When you change the level of a procedure, Control-M / Desktop automatically changes the level of any sub-procedures.	
Files tab	Generate diagnostics on a file basis at the level specified next to each file name.	
Save settings for next runs	Save diagnostic settings as a default for future Control-M / Desktop sessions. Otherwise, the settings take effect for this Control-M / Desktop session only.	

Confirmation defaults

The Confirmations panel determines which confirmation requests and warnings should be displayed for various job, table, and calendar actions before you complete an action. Confirmation options are divided into the following sections:

- Job Confirmations
- Table Confirmations
- Calendar Confirmations
- General Confirmations

To set confirmations

1 Select or deselect the general confirmations that you want displayed.

2 To reassign the originally provided default settings, click **Restore Defaults**.

Forecast defaults

NOTE

The Forecast panel and its defaults settings are only available if the Forecast facility is installed.

Table 74 Forecast settings (Forecast panel) (Part 1 of 2)

Field/option	Default to be set
Color Settings	Color of job nodes in the Forecast flow diagram. You can select the color for executed jobs, non-executed jobs, and the display of the execution time.
Start Day of the Week	Day of the week on which a business week starts in the Forecast multiple nodes calendar display.
Maximum Jobs per Forecast Action	Maximum number of jobs to be included in the Forecast multiple nodes calendar display.
Display execution time	Time reference to be used when displaying the execution time in the job node or Gantt chart: local time or the time according to the Control-M / Server.
Business Service Critical Path	The critical path consists of the jobs in the Business Service that have the most impact on the completion time of the service. The critical path is indicated in the flow diagram by special markings on the job nodes. If Forecast predicts that the Business Service will be delayed, the user can examine the jobs in the critical path to determine what factors are delaying the jobs. Options: ■ **Show complete path** – The entire critical path is indicated. ■ **Show until first gap** – Only the part of the critical path that has the most direct impact on the completion time is indicated.

Table 74 Forecast settings (Forecast panel) (Part 2 of 2)

Field/option	Default to be set
Show Control-M New Day indicators in Gantt view	Display red vertical lines in the Gantt chart that indicate the beginning of the New Day for each Control-M.
Automatic 'Run Forecast' on scenario update	Automatically run a forecast when the What-If scenario is changed.
Show 'What-If Scenario Window' on new What-If	Automatically open the What-If Scenario window when a new What-If event is created.

Setting options for Control-M/EM

This section presents tables with setting options for the following defaults:

- Environment defaults
- Flow diagram defaults
- Alerts defaults
- Reconnection defaults
- Diagnostics defaults
- Confirmation defaults
- Service Monitor Window

Environment defaults

Environment General panel

Table 75 General environment settings (Environment General panel)

Field/option	Default to be set
Auto Open Viewpoint	■ To display an empty Control-M/Enterprise Manager window when you start a Control-M/EM session, leave the field unchecked. (Default.) ■ To automatically display a viewpoint when you start your Control-M/EM session, click the check-box and select one of the following options: ■ To have the same viewpoint always open automatically, click **Select**, and select the viewpoint. ■ To have the last-opened viewpoint from the previous session open automatically, click **Last Viewpoint**. ■ To have the **Open Viewpoint** dialog box automatically displayed, enabling selection of a viewpoint for the current session, click **Display "Open ViewPoint" dialog**.
Enable JEF Undo up to *n* actions	To enable Undo (or Redo) in the job editing form, click the option and select the number of Undo/Redo operations that can be performed. Default: 100. (To perform an Undo or Redo, click **Ctrl+Z** or **Ctrl+Y** in the job editing form.)
Display Tool Tips	Display a tool tip whenever Control-M/EM is started.
Do not receive updates while editing jobs	If someone else updates a job processing definition while you are editing it, by default you receive the updates. By checking this option, will not receive such updates. BMC Software recommends that you do NOT check this box.
Use compact Step Codes grid	The **Step Codes** grid of the job editing form is displayed in a compact format.
Browse and select in **Preset path**	Default location for filter presets.
Help Language	Click **Use local language**.
Viewpoint	If there is only one Sysout for a job, then it will open automatically when the job has finished. Click **Open Sysout, if there is only one Sysout for the job.**

Environment Display panel

Table 76 Environment Display panel default settings

Field/option	Default to be set
Reload active net	When selected, enables information from Control-M to be updated automatically in the Control-M/EM GUI. (If this option is not selected, you must click **Refresh** in the Control-M/EM window, in order to display the latest changes in the production environment.)
Rebuild Flowdiagram when reload active net for minimum *n* jobs	Minimum number (*n*) of job changes (reloads or removals) that causes the flow diagram to be rebuilt from beginning to end rather than updated when the user clicks Refresh. (Normally, when Refresh is clicked, the existing flow diagram is updated — that is, jobs are reloaded or unloaded as necessary. But if there are too many changes, this process is slow, and it quicker and more efficient to rebuild the flow diagram from beginning to end.) Default: This option is checked and *n* is **100** (if there are 100 or more job reloads/removals, the flow diagram is rebuilt.)
Arrange All every *n* seconds	How often to automatically refresh the flow diagram.
Reload resources list every *n* seconds	Enables automatic update of the status of resources in the Active environment as displayed in the Prerequisite Conditions, Control Resources and Quantitative Resources windows. The automatic update occurs at intervals according to the number of seconds specified.
Redraw Flowdiagram every *n* seconds	Sets the time interval for refreshing the Flowdiagram display. Default: **5**
Display status colors in Tree View	Display the colors indicating job status in the Navigation Tree.
Hide empty tables	Do not display a table or Sub-table in the flow diagram if no jobs in the table are scheduled.
Display SMART Tables count in Status Bar	Display the SMART Table count, after the job count, in the status bar.
Display Time Synonym	Normally, time parameters (examples: Time from, Time until, Shout Late time) allow you to specify times ranging from 00:00 through 23:59 hours. However, if you check this option, you can specify time periods ranging from New Day time until New Day-plus-23:59. Example: If New Day time is 7:00 AM, this option allows you to specify a range from 07:00 until 30:59. **Note:** The Time Synonym option exists in Control-M/Desktop, Control-M/EM and the Control-M Reporting facility. Anytime you change this option in one of these windows, the option is automatically changed in the other windows.
Display *n* last Jobs Actions in Report	Maximum number of job and table actions to be displayed in the Action Report window. If more than the specified number of messages are issued, the oldest messages are removed from the window. *n* can be any number from **10** to **999**. Default: **200**

Flow diagram defaults

Flowdiagram General panel

Field/option	Default to be set
Smooth display	When selected, prevents flickering of the display during navigation in the flow diagram. **Note:** Selecting this option slows navigation.
Enable tooltip in low zoom	When selected, enables the node title to be displayed as a *tool tip* (when the mouse pointer remains on the node). **Note:** This option is relevant only for zoom of 40% or lower. With a zoom 50% or higher, node titles are visible in the node.
Graph Placement	Placement of parent job node in the flow diagram (right, middle, left). Default: **Parent in the Middle**.
Click **Maximize Downward Flow**	Flow diagram should be displayed as much as possible in vertical alignment rather than in horizontal alignment.
Click **Minimize Graph Width**	Flow diagram should accommodate the available screen space.
Display *n* nodes in pack	Indicates the number of nodes to display in each stack in the Net Overview. Default: **10** (This is also the minimum value for this field).
Display *n* nodes in separator	In high-level nodes, the number of jobs in the node are displayed in a Histogram in the bottom of the node. This option defines the number of jobs to count as a unit for each level of the Histogram. The default (and minimum) value is **10**.
Start Zoom Level	Default magnification percentage of nodes displayed in Flow Diagram view when viewing a new network.Valid values are 10 through 400.

Flowdiagram Nodes panel

The options of the Control-M/EM Flowdiagram Nodes panel are the same as for the same panel in Control-M/Desktop. For details, see Table 70 on page 354.

Flowdiagram Links panel

Except for the options described below, the options of the Control-M/EM Flowdiagram Links panel are found in the corresponding panel in Control-M/Desktop. For details, see Table 71 on page 354.

Field/option	Default to be set
Display links behind nodes	When selected, displays the connecting lines (that represent the conditional links between jobs) behind the job nodes.
Show links between jobs	When selected, displays job dependencies as lines between jobs in the flow diagram. These dependencies are determined by IN and OUT conditions defined in job processing definitions.

Flowdiagram Colors panel

Except for the options described below, the options of the Control-M/EM Flowdiagram Colors panel are found in the corresponding panel in Control-M/Desktop. For details, see Table 72 on page 356.

Field/option	Default to be set
Sets	Color for all level nodes in the hierarchy.
Archived Background	Background color for archived ViewPoints.

Alerts defaults

The Alerts panel contains several default communication settings for the Global Alerts Server (GAS).

Table 77 Alerts panel

Field/option	Default to be set
Click **Automatically connect to Global Alerts Server** and select the ***server_name***	Control-M/EM should automatically connect to the selected Global Alerts Server when accessing the Alerts window. (The server can be changed from the Alerts window using the Communication => Disconnect and Communication => Connect option. For details, see Chapter 21, "Monitoring and handling alerts.")
New Alert Notification area	How Control-M/EM should handle notification when it receives a new alerts. Click the appropriate button:
	■ **None -** Do not provide any special notification. ■ **Flash Alerts window on task bar -** Flash the Alerts window button on the Microsoft Windows task bar. ■ **Bring Alerts window to front -** Open the Alerts window.
Open into Local View area	In the Alerts window, if you select an alert and choose **Actions => Open into Viewpoint**, the job that prompted the alert and the jobs having a dependency relationship with that job, will be displayed in a Viewpoint. You can set the following defaults regarding this ViewPoint and the jobs it displays:
	■ **Use radius of *n* nodes -** The level of dependencies for which jobs should be selected and displayed in the ViewPoint. ■ **ViewPoint Name** *name* - The ViewPoint into which the jobs should be displayed. BMC Software recommends that you choose a viewpoint having a collection of containing all jobs. If you choose a viewpoint that does not have a collection of all jobs ■ nodes not included in the collection will not be displayed. ■ non-pin collections will probably have poor response time.

Reconnection defaults

The Reconnection panel contains several default settings for reconnecting to an alternative server if the connection to the Control-M/EM GUI server is lost.

Control-M/EM attempts to (re)connect to the first server in a user-defined list of alternate servers. If this fails, Control-M/EM attempts to reconnect to the next server in the list, and this process continues until there is a successful reconnection or until there are no more servers in the list.

After there is a successful reconnection, Control-M/EM continues to function using that alternate server as its GUI server, even restoring ViewPoints if desired. If Control-M/EM cannot connect to any server, a message is displayed indicating that Control-M/EM will shut down.

In addition to enabling specification of alternative servers, this panel enables specification of a number of other defaults, including the intervals at which reconnection should be attempted and the maximum number of retries allowed.

NOTE

Servers whose icons display in red have been manually added to the Alternate Servers list.

Table 78 Reconnection panel default settings

Field/option	Default to be set
Alternative Servers / Select Servers	List the alternative servers. Click the Select Servers button to add, delete, and change the order of, alternate servers. For details, see "To modify the alternative server list."
Check **Automatically reconnect**	Control-M/EM should try to reconnect automatically without user intervention. This is known as Automatic mode. (The user can monitor and intervene as necessary while the connection is being reestablished.)
Restore *xxx* viewpoints	(If clicked) Control-M/EM should open the selected ViewPoints during reconnect. Click and select appropriate value: ■ **Last active ViewPoint** — Only the ViewPoint that was last active should be opened. ■ **All open ViewPoints**— All ViewPoints that were open at the time of the disconnect should be opened.
Max reconnection retries *nn*	Maximum number of reconnection attempts Control-M/EM should make. Default: **5**.
Wait *nn* seconds between reconnection attempts	Number of seconds Control-M/EM should wait between reconnection attempts. Default: **5** seconds.

To modify the alternative server list

1 In the Reconnection panel, click Select Servers.

The Alternative Server Selection dialog box is displayed, listing the available servers on the left and the servers already selected as alternate servers on the right.

2 Select the desired server(s), and click

- **Add** — to designate them as alternate servers.
- **Remove** — to remove them from the alternate server list.
- **Add New** — to add a new server to the list of available servers. The Add New Server dialog box appears. Enter the name of the server and click **OK**.

3 Click **OK**.

The Alternative Server Selection dialog box closes.

Diagnostics defaults

The Diagnostics panel sets defaults for printing diagnostics at the desired severity levels into a log file. The log file can then be sent to BMC Software Technical Support to help you troubleshoot technical problems with Control-M/EM.

The options of the Control-M/EM Diagnostics panel are the same as for the same panel in Control-M/Desktop. For details, see Table 73 on page 356.

NOTE

Use this panel only when instructed by BMC Software Technical Support. Your technical support representative will notify you which fields to change.

Confirmation defaults

The Confirmations panel determines which confirmation requests and warnings should be displayed for various actions.

The process of setting Control-M/EM confirmations is the same as the process for Control-M/Desktop. For details, see "Confirmation defaults" on page 358.

Service Monitor Window

The Service Monitor Window panel determines whether notifications will be sent on new problematic services and how they will be displayed. You can also define the frequency that the Service Monitor Window will be refreshed in seconds.

Setting options for the Control-M Reporting facility

This section presents tables with setting options for the following defaults:

- Environment defaults
- Viewer defaults
- Confirmation defaults

Environment defaults

The Environment panel contains several display default settings for the Control-M Reporting facility Preview window.

Table 79 Environment panel

Field/option	Default to be set
Display Report Tabs	Tabs for each open report (and the Start Page) are displayed in the task bar at the bottom of the screen (default). (If not checked, tabs are not displayed, but you can toggle between open reports through the Window menu option.)
Use flat buttons	Tab appearance: ■ when checked, tabs appear as separate areas on a flat bar. ■ when not checked (default), tabs are raised and distinct.
Display Report Icons	Display report icons ( ) in the report tabs in the taskbar.
Close Report on Double Click	Double-clicking the report tab closes the report. (Depending on other options, a confirmation prompt might be displayed.)
Display full path in tooltips	Full report path will be displayed in a tooltip when you pass the cursor over the tab.
Display Report	Text to appear in the tab. Valid values: ■ Filename — name of the report file ■ Title — report title (might be abbreviated)

Viewer defaults

The Viewer panel contains several display default settings for the Control-M Reporting facility Preview window.

Table 80 Viewer Panel (Part 1 of 2)

Field/option	Default to be set
Display Border	Display a border around the report.
Display Background Edge	Display a background edge between the frame and the top of the page of the report

Table 80 Viewer Panel (Part 2 of 2)

Field/option	Default to be set
Conceal Last Shown Fields if Truncated (Upon Generation)	Do not display a truncated rightmost field in the viewer (if the rightmost field would appear truncated, conceal it).
Zoom Factor: n% **Fit Page Width** **Fit Whole Page**	Default Zoom Level when viewing reports. Select any one of the following levels: ■ set a fixed percentage zoom ■ page width fills the screen (it might be necessary to scroll the length of the page) ■ full page is displayed in the screen

Confirmation defaults

The Confirmations panel determines which confirmation requests and warnings should be displayed for various actions. Confirmation options are divided into the following sections:

- Report Confirmations
- Template Confirmations
- Other Confirmations

The process of setting Control-M/EM confirmations is the same as the process for Control-M/Desktop. For details, see "Confirmation defaults" on page 358.

Examples for defining jobs

This appendix presents the following topics:

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Organizing the company's accounting jobs — the Ex-Accounting application 370
Handling invoicing needs 370
Handling payroll processing needs 373
Organizing the airline company's flight jobs — the Ex-Flights application 375
Handling flight-related communication needs 375
Organizing the IT department maintenance jobs — the Ex-ITMaintenance application 377
Handling IT job backup needs 377
Handling emergency situations 380
Handling component shutdown needs 383

This appendix describes the job processing definitions in a sample draft that comes with this product.

Accessing the sample draft

Control-M/EM comes with several drafts that you can open in Control-M/Desktop. Each draft is located in a subdirectory of the **BMC Software\Control-M EM 7.0.00\Default** directory:

- **Demo.drf**—located in the **\Samples** subdirectory
- **Control-M Server Utilities.drf**—located in the **\Samples** subdirectory
- **EXAMPLES.drf**—located in the **\Samples\User Guide Examples** subdirectory

This appendix examines the jobs in the **EXAMPLES.drf** draft.

When working with this draft, remember that although the jobs are organized into applications and groups, they represent only a small sample of the jobs one might expect to find in such applications, and the only purpose of these jobs is to highlight certain job definition tasks.

Documentation (.txt) files located in the same subdirectory as the draft file describe the jobs in the draft. (The name and path of a job's documentation file appear in the **Doc File** and **Doc Path** fields in the General tab of the job editing form.)

To open the EXAMPLES draft

In Control-M / Desktop, click **File => Open**, browse to **BMC Software \ Control-M EM 7.0.00 \ Default \ Samples \ User Guide Examples** and select **EXAMPLES.drf**.

BMC Software recommends that you choose the **View => Hierarchy => Application/Group/Job** hierarchy, when working with these examples.

Organizing the company's accounting jobs — the Ex-Accounting application

The accounting requirements of the company collectively fall into an application called Ex-Accounting. These accounting requirements, in turn, fall into the following functional groups: Invoicing (Ex-Invoicing) and Payroll (Ex-Payroll).

- Ex-Invoicing—contains invoice jobs
- Ex-Payroll—contains payroll jobs

Handling invoicing needs

To handle its invoicing needs, the company must process several types of information on a daily basis. The company runs a set of batch jobs each day, each job responsible for a particular type of information. The following list indicates the types of information, and the jobs that process the information:

- calculate the day's revenues—CalcRevenue job
- calculate the day's expenses—CalcExpenses job
- calculate the day's profits—CalcProfits job
- determine which customer invoices should be billed that day—DueInvoices job

This appendix examines the job processing definitions that automate the processing of these jobs. (Because of the dependency relationship that exists among the first three job, those jobs are explained together.)

Defining jobs to calculate revenue, expenses and profits

The CalcRevenue, CalcExpenses, and CalcProfit jobs run daily.

The CalcProfit job requires the revenue and expense information generated by the CalcRevenue and CalcExpenses jobs, and therefore can run only after these jobs end.

All three jobs generate a printout of the processing results, and therefore require an available printer.

Defining the job type and other general information about the jobs

For each of these batch jobs, the General tab defines the following information:

- The **Tasktype** is **Job**.
- The **File Name** and **Path** fields identify the file name and location of the batch job. These are required fields for the Job tasktype.

Defining the jobs so that they are scheduled daily

The jobs are scheduled every day. In the Scheduling tab, the following values are selected:

- all values of the Month-Days area (done by clicking **ALL**)
- all values of the Week-Days area (done by clicking **ALL**)
- the relational connector is **Or**, but **And** would also work

Ensuring that CalcProfits runs only after CalcRevenue and CalcExpenses have ended successfully

CalcRevenue and CalcExpenses can run in any order but both of those jobs must end successfully before CalcProfits can run. The Conditions tabs of these jobs are filled in as follows:

- Both CalcRevenue and CalcExpenses have no predecessor jobs and therefore have no In prerequisite conditions.

- When each job, CalcRevenue and CalcExpenses, ends successfully, it adds an Out prerequisite condition (ExCalcRevenuOK and ExCalcExpensesOK, respectively). The date definition for these conditions is the keyword, **ODAT**, which ensures that the condition is added to the system with the original scheduling date of the job. The **+** symbol in the **Effect** column instructs Control-M to add (rather than delete) the condition.

- To ensure CalcProfits runs only after both CalcRevenue and CalcExpenses have successfully ended, CalcProfits has ExCalcRevenuOK and ExCalcExpensesOK defined as In prerequisite conditions. To ensure that these In prerequisite conditions are only satisfied by Out prerequisite conditions from the same day, they are assigned a date value of **ODAT**, which resolves to the original scheduling date. To ensure that both conditions are satisfied, an **AND** relationship value is selected in the field above the In Conditions work area.

- No job other than CalcProfits has CalcRevenue and CalcExpenses as predecessor jobs. To increase system efficiency, after CalcProfits ends successfully, it deletes the ExCalcRevenuOK and ExCalcExpensesOK prerequisite conditions from the system by defining them as Out prerequisite conditions with a **-** symbol in the **Effect** column (to instruct Control-M to delete, rather than add, the conditions). To ensure that only the conditions from that date are deleted, the Out prerequisite conditions are defined with an ODAT date value.

- In case another job has CalcProfits as a predecessor job, after CalcProfits ends successfully, it adds ExCalcProfitsOK as an Out prerequisite condition, with **ODAT** as the date reference, and a **+** symbol in the **Effect** column.

Ensuring that the printer required by each of the jobs is available before the job is submitted

Each of these jobs prints out a report of the data it processes (revenues, expenses, or profits). To ensure that the printer required for printing the reports is available, the Resources tab in each of the jobs indicates that the job requires exclusive control of the printer (in this case, Printer1). The job is not submitted unless the printer is available.

Defining a job that prints invoices that become due

The DueInvoices batch job prints out the list of customers whose invoices have become due.

Defining the job type and other general information about the job

The General tab defines the following information:

- The **Tasktype** is **Job**.
- The **File Name** and **Path** fields identify the file name and location of the batch job. These are required fields for the Job tasktype.

Defining the job so that it is scheduled daily

The job is scheduled every day. In the Scheduling tab, the following values are selected:

- all values of the Month-Days area (done by clicking **ALL**)
- all values of the Week-Days area (done by clicking **ALL**)
- the relational connector is **Or**, but **And** would also work

Ensuring that the printer required by the job is available before job submission

The job prints out a report of the due invoices. To ensure that the printer required for printing the report is available, the Resources tab indicates that the job requires exclusive control of the printer (in this case, Printer1). The job is not submitted unless the printer is available.

Handling payroll processing needs

The company runs a batch job (CalcSalaries) that calculates the salaries to be paid to employees for the month just ended. After these calculations are completed, the company can run a paycheck printing job to print the pay checks. (The sample draft does not contain the job processing definition for the check printing job, but does contain the salary calculating job, described in this appendix).

Defining a job to calculate salaries

This batch job calculates employees salaries for the month just ended.

- It should run once a month, on the first day of each month.
- The job should only run after all employees have submitted their time sheets.
- Because of the confidential nature of information being processed, the job should only run on a Accounting Node node group.
- The job must run by a certain time to ensure that there is time for a different job (not in the draft) to print the pay checks.

Defining the job type and other general information about the job

The General tab defines the following information:

- The **Tasktype** is **Job**.
- The **File Name** and **Path** fields identify the file name and location of the batch job. These are required fields for the Job tasktype.

Defining the job so that it is scheduled on the first day of each month

The job is scheduled on the first day of every month. In the Scheduling tab, the following values are selected:

- day **1** in the Month Days area
- all months in the Months area (done by clicking **ALL**)

Ensuring confidentiality by running the job on a particular node ID

Because of the confidential nature of data being processed, the Execution tab specifies that the job should only run on the **Accounting Node** Node ID / Group, which identifies a computer that is reserved for Accounting processing and physically located in a restricted area.

Ensuring that the job runs in time for pay checks to be printed

The Execution tab specifies that the job can only be submitted between the hours of 1:00 and 3:00 AM. This ensures that the pay check printing job which follows will have plenty of time to print the pay checks before they are needed.

Ensuring that the job is not submitted until all time sheets have been submitted

To ensure that the job is not submitted until all time sheets have been submitted, the Conditions tab contains the EX_TimeSheetSubmitted In prerequisite condition.

This condition is actually a manual condition; that is, it is not added by another job, but is instead added manually by the authorized manager from accounting only after all time sheets have been submitted. (The manager adds the condition using the Why dialog box in Control-M / EM.)

Ensuring that the jobs that depend on successful completion of this job can run after the jobs ends ok.

In case other jobs depend on this job, after the job ends successfully, it adds the Ex_CalcSalariesOK Out prerequisite condition. The date definition for this conditions is the keyword, **ODAT**, which ensures that the condition is added to the system with the original scheduling date of the job. The **+** symbol in the **Effect** column instructs Control-M to add (rather than delete) the condition.

In addition, this job shouts a message to the appropriate location indicating that the pay checks can now be printed. This action is defined in the PostProc tab.

Organizing the airline company's flight jobs — the Ex-Flights application

The primary objective of this airline company is to keep its airline routes functioning according to schedule, its seats booked, and its airplanes flying. The IT jobs that help the company meet its goals fall collectively into an application called Ex-Flights. Though, in reality, jobs in this application would fall into several groups, for simplicity the sample draft contains one group (Ex-Communication, which contains communication jobs), and this group contains one job.

Handling flight-related communication needs

The airline company runs a number of communication jobs. The sample contains one job, UpdateFlightTimes, which updates flight departure and arrival times.

Defining a job that updates flight departure and arrival times

The UpdateFlightTimes job runs a program that distributes updated departure and arrival times to the airline company's travel agents and associated airport monitors and Internet sites.

This batch job should run repeatedly throughout the day (at one minute intervals from the start of the previous iteration).

Defining the job type and other general information about the job

The General tab defines the following:

- The **Tasktype** is **Job**.
- The **File Name** and **Path** fields identify the file name and location of the batch job. These are required fields for the Job tasktype.

Defining the job so that it is scheduled daily

The job is scheduled every day. In the Scheduling tab, the following values are selected:

- all values of the Month-Days area (done by clicking **ALL**)
- all values of the Week-Days area (done by clicking **ALL**)
- the relational connector is **Or**, but **And** would also work

Ensuring that the job cycles through every minute (from the start of the previous iteration)

In the Execution tab, click Cyclic job, and define the cycle interval as every one minute from the start of the job.

Defining special handling if the job does not cycle through successfully

It is critical that the job run every minute, and if there is a problem, it is critical that notification be sent to the main monitor. The Steps tab contains the following definitions:

- If the job status is NOTOK (On stmt = *, Codes = NOTOK) do the following:
  - Stop the job (Do StopCyclic).
  - Shout a very urgent message, “Flight Updates,” to the main monitor.

Providing notification that the job processed successfully

Whenever the job ends successfully, a success message with the job’s runtime is shouted to the main monitor. The Shout message, **Flights updated and distributed at %%TIME**, is defined with a regular urgency in the PostProc tab. (The **%%TIME** AutoEdit variable resolves to the jobs runtime.)

Organizing the IT department maintenance jobs — the Ex-ITMaintenance application

The IT department runs a number of maintenance jobs of different types, that are collectively organized into the Ex-ITMaintenance application. Most of the jobs in the sample draft perform tasks that must be performed in extreme emergencies (fire, floods, tornado watch, and so on). The draft also contains a job for routine, non-emergency backups.

During an extreme emergency, it is imperative that emergency procedures be immediately implemented to get employees to safety, get the system backed up, and to shut down Control-M components. The sequencing of these jobs is important, and this, in turn, affects the groupings of these jobs.

Jobs in this application fall into the following groups:

- jobs to perform backup, in both non-emergency and emergency situations—Ex-Backups
- jobs to initiate emergency procedures in an extreme emergency—Ex-EmergencyProc
- job to shut down Control-M components after the emergency procedures have been implemented—Ex-ComponentStopping

Handling IT job backup needs

The Ex-Backup group contains two jobs, one that performs a standard backup of company data under normal circumstances, and another that performs a full backup in an extreme emergency.

Defining a standard backup job

The Backup job executes an operating system command (“copy”) to back up certain files from a directory to one of two tape drives. It should be scheduled every day.

Defining an operating system command job, and other general information about the job

The General tab defines the following:

- The **Tasktype** is **Command**.

- The **Command** field contains the Copy command to be executed. This is a required field for the Command tasktype.

- **File Name** is an optional field for Command-type jobs. Any value specified in this field appears as the job name in the job node in the flow diagram. Instead of leaving this field blank, BMC Software recommends that you specify the name of the job in this field. In this example, the job name (**Backup**) has been placed in the field.

Defining the job so that it is scheduled daily

The job is scheduled every day. In the Scheduling tab, the following values are selected:

- all values of the Month-Days area (done by clicking **ALL**)
- all values of the Week-Days area (done by clicking **ALL**)
- the relational connector is **Or**, but **And** would also work

Ensuring that required tape drives are available before job submission

Depending on the files being backed-up, this job copies the files to one of two tape drives. To ensure that these tape drives are available, the Resources tab indicates that two tape drives are required (as Quantitative resources). The job is not submitted unless the drives are available and reserved for the job.

Defining an emergency backup job

The BackupAllSystems job is executed only in extreme emergencies. It is not scheduled to run but is instead manually forced when needed. Because this critical batch job can be very damaging to the company if misused, only the CIO can force it. The job requires a large number of tape drives, has no predecessor jobs, and must complete the emergency backups before other jobs can shut down all systems. Once submitted, this job the highest priority.

Defining the job type and other general information about the job

The General tab defines the following:

- The **Tasktype** is **Job**.

- The **File Name** and **Path** fields identify the file name and location of the batch job. These are required fields for the Job tasktype.

- Because this jobs is intended only for an extreme emergency, the Chief Information Officer is identified as the author.

Defining the job scheduling

As already noted, this job is not scheduled. Rather, it is manually forced if needed. Therefore, it has no parameters defined in the Scheduling tab.

Ensuring that the job is treated with the highest priority

Because of the critical and urgent nature of this job, the Execution tab defines the jobs as critical, and assigns it the highest priority (99).

Ensuring that the job has the required tape drives available

BackUpAllSystems must back up all systems to tape. It requires 50 available tape drives before it run. These are defined as quantitative resources in the Resources tab.

Ensuring that successor jobs can run

BackUpAllSystems is a predecessor job to at least one other job. To establish the dependency between this job and its successor jobs, the following prerequisite conditions are defined (either can be used by the successor jobs):

- An appropriate Out prerequisite condition is defined in the Conditions tab. The date defined for this Out prerequisite condition is the keyword, **ODAT**, to ensure that the condition is added to the system with the working date the job was forced. The + symbol in the **Effect** column instructs Control-M to add the condition.
- An additional prerequisite condition is defined in the Steps tab as follows:
  - An On statement (**stmt= *** codes=OK**) is defined to instruct Control-M that the accompanying Do statement is performed if the job ends OK.
  - A Do statement adds a condition with a date value of **ODAT**, indicating that the job's task has been completed. The + symbol in the parameter column indicates that the condition is added (rather than deleted).

NOTE

This condition could have alternatively been defined as Out prerequisite conditions in the Conditions tab.

Shouting appropriate notification when the job ends

After this job has ended successfully (that is, completed the backups), it shouts a very urgent notification to the CIO indicating that the task is completed. This Shout action is defined in the job's PostProc tab.

Handling emergency situations

In the event of an emergency procedure, several tasks must be performed as a prelude to complete shutdown of the entire system.

- All users must log out and leave the office. The AllUsersLogOut job runs a program that instructs all employees to do this immediately.
- All data centers must be informed that this data center can no longer function. The SetUpEmergencyGlobalCondition job performs this task by running a program that sends out a global condition to this effect.
- An emergency backup of all systems must be performed. (This is performed by the BackupAllSystems job in the Ex-Backup group.)

Only after these tasks are completed can systems be stopped. The jobs that stop the systems belong to a different group in this application.

To simplify defining dependencies for these predecessor and successor jobs, and to simplify dependency definition changes that might be needed in the future (such as adding an additional predecessor job), an intermediate job, ShutDownAllSystems, is defined in the Ex-EmergencyProcs group. ShutDownAllSystems is defined as the successor job to the above jobs, and the predecessor job to the jobs in the Ex-ComponentStopping group that shut down Control-M/EM components.

Defining jobs to initiate user logout and notify other data centers that this data center has an emergency shutdown

The AllUsersLogOut and SetUpEmergencyGlobalCondition batch jobs are not scheduled to run; they are irregular, emergency jobs. To execute, these jobs must be manually forced. If misused, these jobs can be exceedingly damaging to the company. Therefore, only the CEO or someone with similar permissions can actually force these jobs. And to ensure that the CEO does not erroneously do so, these jobs require confirmation before submission.

Once submitted, these jobs are more critical than any other jobs. They are therefore defined as critical jobs having the highest priority.

Defining the job type and other general information about the jobs

The General tab defines the following:

- The **Tasktype** is **Job**.
- The **File Name** and **Path** fields identify the file name and location of the batch job. These are required fields for the Job tasktype.

- Because of the potential for harm from these jobs if inappropriately run, the Author fields identify the following authors (only the person named in the Author field can automate these jobs by having the New Day Procedure run them):

  — For the AllUsersLogOut job—the CEO

  — For the SetUpEmergencyGlobalCondition job—the CIO

Defining the job scheduling

As already noted, these jobs are not scheduled. Rather, they are manually forced if needed. Therefore, they have no parameters defined in the Scheduling tab.

Ensuring that the jobs are treated with the highest priority

Because of the critical and urgent nature of these jobs, the Execution tab defines these jobs as critical, and assigns them the highest priority (99).

Ensuring that these jobs are not accidentally run

Because of the potential for harm from these jobs if inappropriately run, these jobs require manual confirmation before they can execute. Manual confirmation is defined by checking the Wait for Confirmation box in the Execution tab.

Ensuring that successor jobs can run

These jobs are predecessor jobs to at least one other job. To establish the dependency between these jobs and their successor jobs, the following prerequisite conditions are defined for each job (either condition can be used by the successor jobs):

- An appropriate Out prerequisite condition is defined in the Conditions tab of each of the jobs. The date defined for this Out prerequisite condition is the keyword, **ODAT**, to ensure that the condition is added to the system with the working date the job was forced. The **+** symbol in the **Effect** column instructs Control-M to add the condition.

- An additional prerequisite condition is defined in the Steps tab as follows:

  — An On statement (**stmt= *** codes=OK**) is defined to instruct Control-M that the accompanying Do statement is performed if the job ends OK.

  — A Do statement adds a condition with a date value of **ODAT**, indicating that the job's task has been completed. The **+** symbol in the parameter column indicates that the condition is added (rather than deleted).

NOTE

This condition could have alternatively been defined as Out prerequisite conditions in the Conditions tab.

Implementing the purpose of the AllUsersLogOut job

The purpose of the AllUsersLogOut job is to notify all users to log out and go home. It does this by shouting a very urgent notification message to this effect to all users. This shout action is defined in the job's PostProc tab.

Initiating the shut down of all systems

The ShutDownAllSystems batch job runs a program that (through the setting of an Out prerequisite condition) enables another set of jobs to shut down Control-M/EM components. ShutDownAllSystems can only run after its predecessor jobs have ended successfully.

Defining the job type and other general information about the job

The General tab defines the following:

- The **Tasktype** is **Job**.
- The **File Name** and **Path** fields identify the file name and location of the batch job. These are required fields for the Job tasktype.
- Because of the potential for harm from this job if inappropriately run, the CIO is defined as the Author. (Only the person named in the Author field can automate this job by having the New Day Procedure run it.)

Defining the job scheduling

This jobs is not scheduled. Rather, it is manually forced if needed. Therefore, it has no parameters defined in the Scheduling tab.

Ensuring that the job is treated with the highest priority

Because of the critical and urgent nature of this jobs, the Execution tab defines it as critical, and assigns it the highest priority (99).

Ensuring that this job does not run until its predecessor jobs have ended

ShutDownAllSystems initiates system shut down. It must not run until:

- all users have logged out (initiated by the AllUsersLogOut job)
- all system files have been backed up (initiated by the BackUpAllSystems job)
- all other data centers have been notified of the shut down (initiated by the SetUpEmergencyGlobalCondition job)

To ensure that it runs only after all its (above-mentioned) predecessor jobs have ended successfully, ShutDownAllSystems contains the following definitions:

- its Conditions tab contains In prerequisite conditions that match the conditions defined in Do Condition statements in the predecessor jobs. These In prerequisite conditions are assigned a date value of **ODAT**.

- the field above the In Conditions work area in the Conditions tab defines an AND relationship between the In prerequisite conditions.

Ensuring that successor jobs can run

This job is a predecessor job to most of the shut down jobs in the Ex-ComponentStopping group. To enable the successor jobs to run, after ShutDownAllSystems adds the following Out prerequisite conditions (with a date of **ODAT** and a **+** symbol in the Effects column) after it ends successfully:

- ShutDownAllSystems-ENDED—this condition defines this jobs as a predecessor job for the remaining jobs in this table (this Out prerequisite condition is defined as an In prerequisite condition for those jobs).

- EX_ShutDownAll—this condition serves as an indicator that this job ended for any other jobs that might need to know.

Handling component shutdown needs

The Ex-ComponentStopping group contains jobs that are used to shut down (stop) Control-M components. Normally, shut down of components is not required. However, situations can arise that require component shutdown. These situations can range from extreme emergencies (as handled in this sample draft) to minor malfunctions, repairs, or maintenance.

Each job in this group shuts down a single component. With the exception of the job that shuts down the gateway, which must run last, the jobs in this group can run in any order or sequence.

Defining jobs that stop the GAS, GCS, and GUI servers and CMS and BIM

These jobs should run only after ShutDownAllSystems (in the Ex-EmergencyProcs group) has ended successfully. As their names indicate

- GASStopped—stops the Global Alerts Server.
- GCSStopped—stops the Global Conditions Server.
- GUIServerStopped—stops the GUI Server.
- CMSStopped—stops the Configuration Management Server.
- BIMStopped—stops the Batch Impact Manager Server.

Defining jobs that implement operating system commands, and other general information about the jobs

Each of these jobs issues an operating system shutdown command. For each of these jobs, the General tab defines the following:

- The **Tasktype** is **Command**.

- The **Command** field contains the following operating system Stop command to be executed: **ctl -u emuser -p empass -C *component* -all -cmd stop**, where ***component*** is the relevant Control-M component (GAS, GCS, and so on). This is a required field for the Command tasktype.

- **File Name** is an optional field for Command-type jobs. Any value specified in this field appears as the job name in the job node in the flow diagram. Instead of leaving this field blank, BMC Software recommends that you specify the name of the job in this field (as has been done in these sample jobs).

Ensuring that these jobs will not run until their predecessor job has ended

Each of these jobs has ShutDownAllSystems-ENDED defined as an In prerequisite condition in its Conditions tab. (This condition is only added after ShutDownAllSystems has ended successfully.) The In prerequisite conditions are assigned a date value of **ODAT**.

Ensuring that successor jobs can run

After each of these jobs ends successfully, it adds two Out prerequisite conditions (for example, EX_GCSStopped and EX_GCSStopped-ENDED), either of which can be used by successor jobs. The date definition for these conditions is the keyword, **ODAT**, which ensures that the condition is added to the system with the original scheduling date of the job. The **+** symbol in the **Effect** column instructs Control-M to add (rather than delete) the condition. (The successor job, GatewayStopped, uses the *name*-ENDED condition.)

Defining a job that stops the gateway

The GatewayStopped job stops the Gateway. It should only be run after the other components have been stopped.

Defining the job to implement an operating system command, and other general information about the job

Like its predecessor jobs, this job issues an operating system Stop command. The General tab defines the following:

- The **Tasktype** is **Command**.
- The **Command** field contains the following operating system Stop command to be executed: **ctl -u emuser -p empass -C Gateway -all -cmd stop**. This is a required field for the Command tasktype.
- **File Name** is an optional field for Command-type jobs. Any value specified in this field appears as the job name in the job node in the flow diagram. Instead of leaving this field blank, BMC Software recommends that you specify the name of the job in this field (as has been done in this sample job).

Ensuring that this job will not run until all its predecessor jobs have ended

To ensure that it runs only after all its predecessor jobs have ended successfully, GatewayStopped contains the following definitions:

- its Conditions tab contains In prerequisite conditions that match an Out prerequisite condition (the *name*-ENDED condition) defined in the Conditions tab of each of its predecessor jobs. These In prerequisite conditions are assigned a date value of **ODAT**.
- the field above the In Conditions work area in the Conditions tab defines an AND relationship between the In prerequisite conditions.

Ensuring that successor jobs can run

After GatewayStopped ends successfully, it adds the Out prerequisite condition EX_GatewayStopped (with a date of **ODAT** and a **+** in the Effects column) that can be used as an In prerequisite condition by other jobs.

Formats, values and functions

This appendix presents the following topics:

Pattern-matching strings 387
Using SQL wildcards 390
Valid functions for Template editor and condition formats 391

This chapter provides the following format rules, valid values, and functions:

- Pattern matching strings — these can be used in fields that support wildcards.
- Valid functions - these can be used in the Template editor (discussed in Chapter 9, "Setting up templates for standardized job and table definition") and in Condition formats (discussed in "Defining dependencies for the current job" on page 108.)

Pattern-matching strings

Fields used to select data (for example, in the Table Manager window), accept pattern-matching strings, or expressions, as input. Using these strings, the user can select many different entities by specifying a relatively simple combination of characters and symbols.

NOTE

The use of complex expressions tends to reduce performance.

Table 81 describes the symbols used to compose pattern-matching strings.

Table 81 Symbols used to compose pattern-matching strings (Part 1 of 2)

Symbol	Name	Usage
*	Asterisk wildcard	Denotes any number of characters (including no characters). This can be inserted in place of a string. **Note:** If one or more filter criteria fields are not needed, it is more efficient to leave the field blank than to use the "*" character. However, at least one filter criteria field must have a value.
? or **.**	Question mark wildcard, or period	Denotes any single character. This can be inserted in place of any number of characters.
!	Exclamation	Denotes all possibilities that do not match the pattern that immediately follows the **!** character. This can be specified to exclude the pattern immediately following the **!** from the result. Where a pattern begins with **!**, the escape character backslash "\" can be used to escape the **!** and either include or exclude the pattern (required only where **!** is the first character). For example, to include occurrences of "**!wip**", use the pattern "**\!wip**", whereas "**!\!wip**" excludes "**!**wip". **Note:** **!** must be the first character of the string, for example, in the expression (first**!**,**!**one) the exclamation is part of the string "first**!**", but is used to exclude the string "one". ■ **!** is evaluated literally in collection and filter definition fields.
[ ]	Brackets	Denotes different possibilities for a single character. The brackets enclose a string of possible values. In addition, the following symbols can be used within the brackets: ■ **–** denotes a range of characters. ■ **^** used as the first character in the brackets to denote "not".
, or **|**	Comma or pipe	Used to separate pattern-matching strings, enabling the user to specify more than one string (the comma represents a Boolean OR). **Example** (host01, host02, host03) **Note:** "," is evaluated literally in collection and filter definition fields.
character	Character	Any character, other than one of the above, denotes the specific character. **Note:** In case-sensitive fields, Control-M / Desktop differentiates between uppercase and lowercase characters (for example, "a" and "A" are regarded as two different characters).

Table 81 Symbols used to compose pattern-matching strings (Part 2 of 2)

Symbol	Name	Usage
^	Anchor (start)	■ Denotes "not" when used as the first character in brackets [ ]. ■ Denotes the start of a word when not specified in brackets [ ].
$	Anchor (end)	Denotes the end of a word.
specialchar	Escape character	Denotes the literal value of the special character. The special characters are the symbols described in this table. **Examples** ■ To specify \, type \\. ■ If you specify **\.** then "**.**" has the meaning of period and not the same meaning as **?.** ■ Use "\" to escape **!** only where **!** is the first character.
+	Plus	Used with \ (described above) to denote the literal value of the special character. For example, **<CYCLIC_INTERVAL_SEQUENCE FROM="\+60M\,\+3H" TO="+30M,+6H" />**

NOTE

XML term files support the use of "," to separate values and "!" to exclude values.

TIP

If you use special characters, such as asterisk, as a literal part of the object name (for example, **glo*-job1_started**), and when you filter you want to include only these objects (for example, you do not want to include **glo-job1_started**), specify \ before the special character in the filter prefix (for example, **glo***). Otherwise, objects without the special character (for example, **glo-job1_started**) will also be included. (Wherever possible, try to avoid defining object names with special characters as literals.)

Table 82 lists examples of expressions used to select data centers. Specifying any one of them would include data center DALLAS.

Table 82 Examples of expressions (Part 1 of 2)

Pattern	Includes...
DALLAS, NY, LA	The three data centers DALLAS, NY, LA.
D*S	All data centers whose name starts with D and ends with S.
D????S	All data centers whose name starts with D, ends with S and consists of six characters.
D*ALL?S	All data centers whose name starts with D and ends with five letters matching the pattern signified by ALL?S.
!NY	All data centers except for NY.

Table 82 Examples of expressions (Part 2 of 2)

Pattern	Includes...
LA,!NY,D*S	Data centers LA and DALLAS, excluding NY.
DALLAS,TEXAS*	The data centers DALLAS and TEXAS*.
D[ABC]*	All data centers whose name starts with D and whose second letter is A, B or C.
D[A-E]????	All data centers whose name starts with D, whose second letter is in the range of A-E and whose name consists of six characters.
D[^B-Z]*	All data centers whose name starts with D and whose second letter is not in the range of B-Z.
NY,D*S	Data center NY and all data centers matching the pattern signified by D*S.

Using SQL wildcards

The SQL wildcards

- **%** denotes any or no character
- **_** denotes any one character

These wildcard characters, when used in ViewPoint collections and filter definitions, are evaluated as literal % and _ characters, (not as wildcards).

Valid functions for Template editor and condition formats

This table lists valid functions for use in the Template editor and condition formats (including the assign function in Find and Update).

Table 83 Valid functions — Template editor and condition formats

Function	Description	
{Field Name}	Name of a field in the job or group processing definition. Use the name of the field exactly as it appears in the **From source** list in the Insert Function dialog box. For example, the Mem Name of this job is {Mem Name}. **Note for conditions and condition formats:** Where you specify both a FromJob (predecessor job) field name and a ToJob (successor job) field name, the format is ■ For the FromJob: **{***fieldname***}** ■ For the ToJob: **{ToJob[***fieldname***]}** For example, to indicate the **Mem Name** of the FromJob and ToJob, specify **{Mem Name}-{ToJob[Mem Name]}**.	
{Counter}	Incremental number to be inserted in the value (for example, **This job is Job # {Counter}**).	
{+ | -{numerical field | function},quantity to add or subtract}		
	Indicates an amount to increment or decrement a number in the condition name format. This function can be used to reference a previous or subsequent job (for example, **Job#{-{Counter},1}-ENDED)**.	
{Substr *position.length,{fieldname | function}*}		
	Substring from a specified field or function.	
	position	Offset of the substring within the field / function (zero-based)
	length	Number of characters
	fieldname	Name of the field
	function	Name of the function
	For example, to indicate the first two characters of Mem Name, specify **{Substr 0.2,{Mem Name}}**.	

Checking job and table processing definition validity

This appendix presents the following topic:

Checking the validity of job and table processing definitions 393

Checking the validity of job and table processing definitions

NOTE

By default, the validity of job and table processing definitions is automatically checked when you save the definitions, and this procedure is not necessary. Use this procedure only if you changed the default so that the job or table processing definition validity is not automatically checked.

Though generally not recommended, you can change the default so that the validity of job and table processing definitions that you define in your local workspace is not checked. For example, you might want to create a template (see Chapter 9, “Setting up templates for standardized job and table definition”) or perform a mass job create (see Chapter 10, “Creating and updating many jobs at once”) that will not pass validity checks until you later manually add more details. (To change the default setting of the automatic validity checker, use the General options panel of Control-M/Desktop, which you can access by choosing **Tools => Options**.)

If you changed the default, you should perform the validity checks (as described in this section) before writing, uploading or ordering the jobs or tables, or you might corrupt your database. (And when you are ready, ensure that you set the default back to automatic validity checking.)

To check the validity of the jobs and tables in a draft

In Control-M/Desktop, open the draft and choose **Tools => Validity Checks**.

Control-M/Desktop checks the validity of all job processing definitions in the draft and displays the errors in the Validity Checks Error Messages dialog box.

To correct the errors found during a validity check

Use one of the following methods to correct errors found during a validity check:

- Double-click the job or table name in the Validity Checks Error Messages dialog box to open the job or table editing form for the job or table. Make the necessary corrections and then click **OK** to save the changes to the job or table processing definition.
- If many jobs or tables have the same error(s), use the Find and Update facility to make the corrections. For more information, see "Finding and updating many entities at once" on page 178.

Troubleshooting

This appendix presents the following topics:

Connectivity problems 395
Reporting Facility connectivity errors 398

Connectivity problems

This section provides information on how to troubleshoot problems connecting the Control-M/EM server to Control-M/EM and Control-M/Desktop.

The Control-M/EM GUI and Control-M/Desktop use a callback connection method for several actions such as Upload Table and Open ViewPoint.

Control-M/EM uses a single XML CORBA configuration file, called **config.xml** that defines CORBA configuration data for all CORBA components (clients and servers included). During installation, the file is configured with default values for the components. Sometimes, when the client machine has more than one IP address, the default configuration does not provide optimum performance, resulting in a failure.

If the callback connection fails during login, the Connectivity Failure window is displayed, warning the user about the connectivity failure. Ignoring this warning message may result in a failure to open a ViewPoint or upload or order a table from the Control-M/EM server.

The Connectivity Failure window indicates that the Control-M/EM server is not connected to Control-M/EM GUI client and Control-M/Desktop. The Connectivity Failure window enables the user to resolve the problem either automatically or manually.

During the automatic resolution, all available IP addresses are scanned, the best IP address (with the shortest response time) is identified, and the CORBA configuration file is modified accordingly.

Alternately, the user can manually resolve the connectivity problem, by specifying connection configurations and testing them.

To automatically resolve a connectivity problem

1 Click **Repair** to allow for automatic identification of available IP addresses.

The connectivity problem is automatically resolved by using the IP address displayed in the window.

NOTE

If the automatic resolution failed, use the manual resolution procedure described below, ensuring that the **Use bidirectional communication** check box is selected.

2 Click **Close**.

NOTE

The configuration changes affect the entire installation, including client and server processes that were running while the changes were made. You should restart every running Control-M/EM application, such as the Control-M/EM GUI client, Control-M/EM GUI server, Control-M/Desktop, GAS server, Control-M/Forecast server, BMC Batch Impact Manager server, and CMS server.

To manually resolve a connectivity problem

1 Click **Advanced** to open the Troubleshoot Connectivity window.

2 In the Troubleshoot Connectivity window, temporarily clear the **Use bidirectional communication** check box for this procedure.

NOTE

The **Use bidirectional communication** check box at the bottom of the window reflects the value of the -BiDirPolicy parameter in the CORBA configuration file. By default, all Control-M/EM processes use bidirectional communication.

When testing the accessibility of the hostname or IP address of the client, it is important that you clear the **Use bidirectional communication** check box. This would force the server to resolve the client's address and initiate a connection back to it. After the correct hostname or IP address is identified, reselect the **Use bidirectional communication** check box.

If the Control-M/EM GUI server cannot initiate a connection to client computers (for example, because of a firewall rule blocking ports for outgoing connections on the server side, or blocking ports for incoming connections on the client side) – all configuration options will fail when the bidirectional check box is cleared. In this situation, ensure that the **Use bidirectional communication** check box is selected.

3 Select one of the following:

- **Use Specific IP Address** - select an IP address from the list of all enabled network interfaces on the computer.
- **Use IP Address matching Specific mask** - specify an IP mask.

  This option is recommended when using VPN connections, since the IP addresses may change dynamically. By using an IP mask, you avoid the need of reconfiguring CORBA each time you reconnect. (For example, at runtime the subnet mask "137.72.114.0" will prefer the IP address "137.72.114.142" to "192.168.241.3".) In the configuration file, the mask is set in the –PreferIPMask parameter, and the hostname_in_ior value is $IP (which is evaluated at runtime). If this option is selected, the "$IP" characters are displayed in the Troubleshoot Connectivity window; accidently deleting them prevents the mask from being evaluated at runtime.
- **Use Virtual Hostname or IP Address** - set a virtual hostname (for example, on a cluster machine), a known hostname, or a fixed IP address.
- **Default** - the current default hostname or IP address is specified in brackets.

  In the CORBA configuration file, the value of the –ORBDottedDecimalAddresses parameter determines whether the default is an IP address (value = 1) or a hostname address (value = 0).

4 Click **Test**. The configuration specified for the client is tested for its connectivity with the Control-M/EM server. A check mark indicates connectivity.

5 Select the **Use bidirectional communication** check box.

6 Click **OK** to change the CORBA configuration file according to the specified configuration. (Note: The configuration file is changed even if the configuration failed the connectivity test.)

NOTE

- The configuration changes affect the entire installation, including client and server processes that were running while the changes were made. You should restart every running Control-M/EM application, such as the Control-M/EM GUI client, Control-M/EM GUI server, Control-M/Desktop, GAS server, Control-M/Forecast server, BMC Batch Impact Manager server, and CMS server.
- Accessing Troubleshoot Connectivity window using **Tools=>Connection=>Troubleshoot Connectivity** and changing the configuration requires restarting the Control-M/EM GUI client or reconnecting to the Control-M/EM GUI server.

Reporting Facility connectivity errors

You can manually set the hostname and port using the Control-M Configuration Manager.

To manually resolve Reporting Facility connectivity errors

1 In Control-M Configuration Manager, select **Database => Location**.

2 In the Database Hostname & Port dialog box, specify the database host and port values.

3 Click **OK**.

Connectivity issues

The Reporting Facility cannot connect to the Control-M/EM database under the following circumstances:

- Control-M/EM fails to retrieve the database hostname and port when trying to connect. This failure occurs more often for Sybase users. The following error message is displayed:

  ```
  EM-75002E Failed to retrieve database host and port.
  ```

- Control-M/EM retrieves the incorrect database hostname and port. This most often occurs when working with a failover database server in Oracle. The following error message is displayed:

```
EM-75003E The Reporting Facility is unable to connect to the
database. Either the database:

— is not running
— OLEDB driver is not installed or registered

Check the log file for more information.
```

The hostname and port used to try to connect to the database are provided following the error message.

Both scenarios require manually resetting the hostname and port using the Control-M Configuration Manager.

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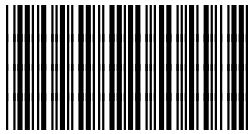

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